Grayling II Site Characterization and Data Summary

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Charles D. Hahn

U.S. Army Engineer Waterways Experiment Station
Vicksburg, MS

SWOE Report 94-7
November 1994

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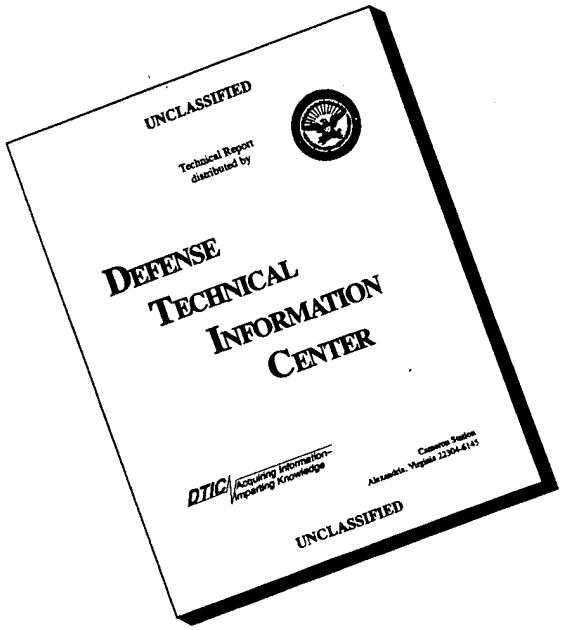

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FOREWORD

SWOE Report 94-7, November 1994, was prepared by C. Hahn of U.S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.

This report is a contribution to the Smart Weapons Operability Enhancement (SWOE) Program. SWOE is a coordinated, Army, Navy, Marine Corps and Air Force program initiated to enhance performance of future smart weapon systems.

Performance of smart weapons can vary widely, depending on the environment in which the systems operate. Temporal and spatial dynamics can significantly impact weapon performance. Testing of developmental weapon systems has been limited to a few selected combinations of targets and environmental conditions, primarily because of the high costs of full-scale field tests and limited access to the areas or events for which performance data are required.

Performance predictions are needed for a broad range of possible battlefield environmental conditions and targets. Meeting this need takes advantage of significant DoD investments by Army, Navy, Marine Corps, Air Force and ARPA in 1) basic and applied environmental research, data collection, analysis, modeling and rendering capabilities, 2) extensive target measurement capabilities and geometry models, and 3) currently available computational capabilities.

SWOE is developing, validating, and demonstrating the capability to handle complex target and background environment interactions for a broad range of battlefield conditions. SWOE is providing the DoD smart weapons and autonomous target recognition (ATR) communities with measurements, information bases, modeling and scene rendering techniques for complex environments. These are products of a DoD-wide partnership that works in concert with both advanced weapon system developers and major weapon system test and evaluation programs.

The SWOE program started in FY89 under Balanced Technology Initiative (BTI) sponsorship. Present sponsorship is by the U.S. Army Corps of Engineers (lead service), the individual services, and the Joint Test and Evaluation (JT&E) program of the Office of the Director of Test & Evaluation, Office of the Under Secretary of Defense OUSD(A/DT&E).

The Joint Test Director is Dr. J.P. Welsh. The Deputy Test Directors are: COL Jerre Wilson (U.S. Army) and Maj Richard Jennings (U.S. Air Force). The Modeling Configuration Manager is Dr. George G. Koenig.

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13. ABSTRACT *(Maximum 200 words)*

The purpose of the Smart Weapons Operability Enhancement (SWOE) Joint Test and Evaluation Program is to validate the SWOE scene generation procedure. Once validated, this procedure will hopefully change the design-test-redesign approach to smart weapons development, test, and evaluation. Using the SWOE process, smart weapons designers will be able to evaluate their sensor algorithms on simulated scenes with a greater degree of variability than is often presented during the test phase of the design process. The SWOE process will also allow for the smart weapons designs to be evaluated for different environments without the need for expensive and time-consuming data collection exercises.

This report describes the site of the SWOE Grayling II data collection exercise, the data collection plans and techniques used, and the data collected. The data collection period covered 43 days from 4 March to 15 April 1994, and this report presents the meteorological, thermal, infrared, and other environmental data collected by the U.S. Army Engineer Waterways Experiment Station.

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Contents

List of Illustrations

List of Tables

List of Appendices

Preface

The data collection activities reported herein were conducted by the U.S. Army Engineer Waterways Experiment Station (WES) to characterize the site and scene conditions during the Smart Weapons Operability Enhancement (SWOE) Joint Test and Evaluation (JT&E) Grayling II exercise conducted at Camp Grayling, Grayling, MI, from 4 March 1994 to 15 April 1994. It was funded by the Department of Defense SWOE JT&E Program Office, Hanover, NH. Dr. J. Pat Welsh was the Joint Test Director.

WES has prepared three related reports in support of the Grayling II exercise for the SWOE JT&E program. These are as follows:

a. "Grayling II Information Base for Generation of Synthetic Thermal Scenes"

b. "Grayling II Site Characterization and Data Summary"

c. "Analysis of Thermal Imagery Collected at Grayling II, Grayling, Michigan"

This study was conducted under the general supervision of Dr. John W. Keeley, Director, Environmental Laboratory (EL), WES; Dr. Robert M. Engler, Chief, Natural Resources Division (NRD), EL; and Mr. Harold W. West, Chief, Environmental Characterization Branch (ECB), NRD; and under the direct supervision of Mr. Charles D. Hahn, WES project coordinator. Mr. Hahn prepared this report. Field support was provided by Messrs. Thomas E. Berry, Salvador Rivera, Jr., and M. Joe Wooley, ECB, Mr. David Leese of Instrumentation Services Division, WES, and Mr. Charles Hearn of Engineering and Construction Services Division, WES.

At the time of publication of this report, Director of WES was Dr. Robert W. Whalin. Commander was COL Bruce K. Howard, EN.

1 Introduction

The Smart Weapons Operability Enhancement (SWOE) Joint Test and Evaluation (JT&E) Program is a coordinated multiservice effort to address problems related to smart weapon system development, test, and evaluation (DT&E) in the worldwide range of battlefield environment conditions. The thrust of the SWOE Grayling II exercise was to collect environmental data necessary to generate synthetic thermal infrared (IR) and millimeter wave (MMW) scenes and to collect IR and MMW data for use in the validation of the SWOE synthetic scene generation process.

Background

With the reduction in armed forces personnel in the United States military, smart weapons are being required to play an ever increasing role in modern warfare. Current development, test, refine, and retest approaches to smart weapon development are becoming more expensive because of the lengthy field data collections and tests necessary to improve system performance. The purpose of the SWOE JT&E Program is to validate simulation procedures for generating realistic synthetic scenes for the candidate IR and MMW sensors and sensor systems. The generated synthetic scenes can be convolved with the appropriate sensor characteristics and then can be used to design and evaluate weapon system targeting algorithms. This approach to smart weapon DT&E represents a radical change in current methods and can drastically reduce the costs associated with the testing of candidate smart weapon systems. The SWOE scene generation process uses a high-resolution digital topographic elevation data set with the corresponding vegetation, soil, and other terrain feature data, and meteorological data from the desired area to generate three-dimensional (3-D) scenes from any view geometry desired. This end-to-end scene generation process allows weapon system targeting algorithms to be evaluated against a variety of background and meteorological conditions and viewing geometries without being limited to what is available during a real field program.

Approach

As part of the SWOE JT&E Grayling II data collection exercise, the U.S. Army Engineer Waterways Experiment Station (WES) provided quantitative characterization of vegetation, soil, topographic, and road features, collected continuous surface temperature data on dominate terrain features, and collected high-resolution IR image data of selected terrain and target (vehicles) features in the field of regard. WES also provided survey control of all the IR- and MMW-based data collection systems used by the Airborne Seeker Evaluation Test System (ASETS) of the 46 Test Wing, U.S. Air Force, Eglin Air Force Base (EAFB), FL. In addition to this, WES collected site condition color video data and greytone visual data (0.3 to 0.7 μm) for each daylight mission to document the changes in site conditions during the 43-day SWOE Grayling II exercise.

Scope

This report discusses the site characterization procedures used by WES in support of the SWOE JT&E Grayling II exercise and presents data collected and analysis conducted. WES collected many different types of data to support the SWOE JT&E Grayling II exercise. These included plant characterization data of trees and shrubs, survey of the instrumentation and feature locations, soil surface temperature data, soil moisture data, feature apparent temperature data, color video and charge-coupled device (CCD) imagery (0.3 to 0.7 μm) for snow cover mapping, and high resolution color video, shortwave IR (SWIR), and long-wave IR (LWIR) imagery of 12 terrain features and targets (vehicles) throughout the field of regard. WES also collected meteorological data during the SWOE JT&E Grayling II exercise.

2 Site Characterization Procedures

WES was responsible for characterization of the site conditions in support of the SWOE Grayling II exercise conducted 4 March 1994 to 15 April 1994. Measurements were made to describe the vegetation, soil, roads, and topography of the site. The measurement procedures used by WES are described in the following paragraphs.

The data collection area was divided into five sites: Site E (universal transverse Mercator (UTM) coordinates 687245E 4951961N), the primary imaging and data collection area; Site C (UTM Coordinates 687625E 4951970N), a forested canopy area; Site D (UTM coordinates 687382E 4952450N), a deciduous tree area on the west side of the valley; Site F (UTM coordinates 687934E 4952683N), a south-facing bare hillside; and Site A1 (UTM coordinates 687067E 4952031N), the location of the data collection facilities and support trailers (see Figure 1). The Site E area was imaged using equipment from the U.S. Army Research Laboratory (ARL) Battlefield Environment Directorate (BED), the U.S. Army Engineer Cold Regions Research and Engineering Laboratory (CRREL), EAFB, and WES. The ARL-BED and the CRREL systems imaged the area from a shared position looking from the west (look angle 66°7′59″N), while the Thermal Image Processing System (TIPS) tower-mounted imagers viewed the area from the north (look angle 170°48′47″N). Data were also collected on this site using the MMW (95 Ghz) system developed by ARL-Signals, Sensors, Systems and Intelligence (S^3I) Directorate. The ARL-BED and CRREL IR systems and the EAFB TIPS systems imaged a portion of the area using Agema 880 thermal scanners fitted with 20-deg field of view (FOV) lenses collecting imagery in the SWIR (2 to 5.6 μm) and the LWIR (8 to 12 μm) bands. The terrain in this site was primarily flat with a few small (<1 m) topographic undulations. Vegetation consisted primarily of grasses with scattered deciduous black oak, red oak, and coniferous (jack pine) scrub bushes and trees. CRREL instrumented this site with two meteorological stations (Met Site E3 UTM coordinates 687303E 4952044N and Met Site E4 UTM coordinates 687198E 4951902N) to collect data on air temperature, relative humidity, barometric pressure, solar radiation, wind speed and direction, visibility, and precipitation. In addition to these data, two noncontact IR thermometers (staring

radiometers) were deployed by CRREL at each site looking the same directions as the ARL-BED and CRREL and the TIPS imaging systems, to measure the differences in thermal signatures with regard to the different viewing geometries. This site was also instrumented by WES with two thermistor arrays (16 thermistors per array) to measure the soil surface temperature. Additional meteorological stations were deployed by ARL-BED at Sites A1, C, D, and F to collect data similar to that collected at Site E. Site C was instrumented to collect solar radiation and wind data at three levels (2, 12, and 20 m above ground level), but did not collect precipitation data or staring radiometer data. WES deployed two arrays of eight staring radiometers at Site D to measure the apparent temperatures of representative terrain features.

Plant Characterization Measurements

Prior to the Grayling II exercise (October 1993), WES conducted detailed plant characterization of the trees and shrubs in the primary data collection areas (Sites D, E, and F and along the sandy vehicle test track). Individual trees/shrubs were described and surveyed using a Wild T1000 electronic theodolite and Wild DI3000 laser rangefinder. Measurements were obtained on the height and crown diameter of the trees/shrubs. Control points for the survey were established using Trimble 4000SST dual frequency Global Positioning System (GPS) receivers and two high order benchmarks that were located at Palm Port and Bald Hill.

Instrumentation and Feature Survey Measurements

Instrumentation and features (both natural terrain and man-made) were surveyed throughout the Grayling II field exercise using the electronic theodolite/laser rangefinder. Instrumentation included the primary meteorological towers at each site as well as any instrumentation located off the towers. The SWOE instrumentation included rain gauges, soil temperature probes, visibility sensors, solar radiometers, and other types of instrumentation. Features included burner and radar reflector arrays used to reference the airborne imagery, a large panel marked to aid the aircraft's pilot, ARL-S^3I radar calibration reflectors, and the target vehicle locations. Also surveyed were the locations of the sensor platforms (MMW radar pedestal, IR cameras) and the ends (center front and rear) of each participant's data collection trailers, SWOE modeling trailer and adminstration trailer, and the EAFB-Chicken Little mission control building. These data were reduced and checked onsite and made available to the SWOE data management team (DMT).

Soil Surface Temperature Measurements

Soil surface temperatures were measured at Sites E3 and E4 using arrays of 16 thermistors at each site. The thermistors were deployed in October 1993 prior to the ground freezing to minimize the impact on the soil/snow surface during the Grayling II exercise. The locations of these sensors are shown in Tables 1 and 2.

Table 1
Site E3 Soil Surface Temperature Array

Channel Number	UTM Coordinates		Terrain
	Easting m	Northing m	
1	687284	4951941	Snow/Grassy Area
2	687279	4951940	Snow/Grassy Area
3	687284	4951937	Snow/Grassy Area
4	687285	4951950	Snow/Grassy Area
5	687280	4951938	Snow/Grassy Area
6	687283	4951946	Snow/Grassy Area
7	687278	4951946	Snow/Grassy Area
8	687283	4951933	Snow/Grassy Area
9	687278	4951935	Snow/Grassy Area
10	687284	4951945	Snow/Grassy Area
11	687275	4951944	Snow/Grassy Area
12	687286	4951944	Snow/Grassy Area
13	687278	4951941	Snow/Grassy Area
14	687281	4951936	Snow/Grassy Area
15	687284	4951948	Snow/Grassy Area
16	687274	4951941	Snow/Grassy Area

Table 2
Site E4 Soil Surface Temperature Array

Channel Number	UTM Coordinates		Terrain
	Easting m	Northing m	
1	687220	4951989	Snow/Grassy Area
2	687227	4951994	Snow/Grassy Area
3	687221	4951992	Snow/Grassy Area
4	687219	4951997	Snow/Grassy Area
5	687218	4951994	Snow/Grassy Area
6	687223	4951988	Snow/Grassy Area
7	687228	4951990	Snow/Grassy Area
8	687217	4951991	Snow/Grassy Area
9	687222	4951995	Snow/Grassy Area
10	687221	4951986	Snow/Grassy Area
11	687223	4951985	Snow/Grassy Area
12	687217	4951986	Snow/Grassy Area
13	687225	4951988	Snow Grassy Area
14	687215	4951986	Snow/Grassy Area
15	687215	4951989	Snow/Grassy Area
16	687225	4951992	Snow/Grassy Area

These thermistors were interfaced with a Campbell Scientific CR21X datalogger. These sensor arrays were configured to collect 1-min measurements and transmit the collected data to the WES field data collection facility hourly where the data were quality checked using a three-step quality control procedure. The first step of this quality control consisted of a limit check where the data were compared with expected upper and lower limits to remove data that were grossly out of range. The second

step consisted of calculating the mean and standard deviation for each minute's data and making certain that each temperature measurement fell within the interval of the mean plus and minus four standard deviations as noted below:

$$(\bar{T} - 4 \times \sigma) \leq T_i \leq (\bar{T} + 4 \times \sigma)$$

where

$\bar{T}$ = mean temperature at 1-min interval

σ = standard deviation of all measurement in 1-min interval

This step was used to detect problems with sensors and signal conditioning electronics and to detect more subtle errors in the data record. The final quality control step consisted of a visual (graphical) check of the data to ensure that intermittent errors were discarded. Any erroneous data were discarded and replaced with a missing data code (99.00). These data were then stored on the WES file server and made available daily to the SWOE DMT (via the network).

Soil Moisture Content Measurements

The field activities plan (SWOE Field Activities Plan, Grayling II, 1994) called for WES and CRREL to jointly collect daily soil moisture samples from each of the five data collection sites. The locations for these samples were determined by a random sampling procedure.[1] The number of paces was determined using a random number generator. Two samples were taken from each location: the first sample from the top 1- to 2-cm layer and the second from the 4- to 7-cm layer. Soil moisture was determined using an oven-drying (gravimetric) method. Soil moisture was determined by weighing the wet sample, drying 24 hr, reweighing, drying an additional 24 hr, then weighing again to determine the final dry weight. Moisture was calculated using a dry weight basis. Samples were not taken if the snow depth exceeded 2 cm or if the ground was frozen. The data were collected to gain an understanding of the temporal and spatial variability in soil moisture.

Feature Apparent Temperature Measurements

Two arrays of eight IR noncontact thermometers (staring radiometers) were deployed by WES at Site D to measure the apparent temperatures of representative terrain features. These features are shown in Tables 3 and 4.

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[1] SWOE. (1994). "Field activities plan, Grayling II, 4 March - 15 April 1994," U.S. Army Engineer, Cold Regions Research and Engineering Laboratory, Hanover, NH.

Table 3
Site D Feature Array 1 Sensor Locations

Channel Number	UTM Coordinates		Description
	Easting, m	Northing, m	
1	687365	4952450	East Side of Oak Tree Trunk
2	687365	4952449	South Side of Oak Tree Trunk
3	687364	4952450	South Side of Oak Tree Trunk
4	687370	4952444	Small Bush
5	687360	4952446	Grassy/Soil Area
6	687358	4952450	Grassy/Soil Area
7	687362	4952453	Shaded Small Vegetation (<0.1 m)
8	687369	4952448	Unshaded Small Vegetation (<0.1 m)

Table 4
Site D Feature Array 2 Sensor Locations

Channel Number	UTM Coordinates		Description
	Easting, m	Northing, m	
1	687385	4952469	Grassy Area
2	687381	4952463	Scrub Oak Crown
3	687382	4952469	Scrub Oak Crown
4	687379	4952469	Grassy Area
5	687384	4952458	Large Scrub Oak Crown
6	687382	4952461	Assorted Scrub Brush
7	687376	4952467	Hillside Grassy Vegetation
8	687381	4952468	Sandy Soil Area

Snow Cover Mapping Data

WES used a Photometrics CCD camera with a 35-deg FOV lens and a color video with a 23-deg FOV lens mounted on the WES boom truck to collect image data (centered on Sites E and F) for mapping of snow cover. Images were acquired prior to each daylight mission whenever possible; if acquiring imagery prior to the mission proved impossible because of a previous mission or a lack of available light, the images were collected immediately following the mission. CCD Image 1 data were transmitted

electronically to WES where they were processed and snow cover maps were generated. WES color video images were collected and stored on video tape.

Infrared Measurements

WES collected high-resolution imagery of selected terrain and target features during the Grayling II exercise using a special electro-optic (EO) imaging system (Figures 2-5). This system consists of a remote-controlled video camera (remote control of zoom, focus, and iris) (Figure 2), a Photometrics IC200 CCD camera (Figure 3), an Agema 900SW (2.5 to 5 μm) IR scanner fitted with a 2.5-deg FOV lens (Figure 4), and an Agema 900LW (8 to 14 μm) scanner also fitted with a 2.5-deg FOV lens (Figure 5) all mounted on a computer-controlled pan and tilt mount (Figure 6). Capable of pointing accuracies on the order of 0.02 deg, this mount was fixed on the WES boom truck (Figure 7) enabling the system's use to a height of 16.8 m above ground level. Specifications for the Agema scanners are shown in Table 5.

Table 5
Agema 900 Scanner Specifications

Scanner	900SW	900LW
Detector	2xInSb Cryogenically cooled	MCT Cryogenically cooled
Spectral Response	2 to 5.6 μm	8 to 12 μm
Frame Frequency	15 and 30 Hz Selectable	15 and 30 Hz Selectable
Line Frequency	2.5 KHz	2.5 Khz
Lines/Frame	136	136
Samples/Line	272	272
Temperature Range	-20 to 500 °C	-30 to 1500 °C
Sensitivity at 30 °C	0.1 °C	0.08 °C
Accuracy	± 1 °C or ± 1%	± 1 °C or ± 1%
Repeatability	± 0.5 °C or ± 0.5%	± 0.5 °C or ± 0.5%
Dynamic Range	12 bit (4,096 levels)	12 bit (4,096 levels)

The procedure followed for each mission was first to obtain the snow cover imagery (if sufficient light and time were available). The pointing system was aligned using a fixed ground reference (electric light bulb). Each 1-hr mission consisted of 12 randomly selected 1-min sampling periods

(passes). During the odd sampling number periods (i.e., Passes 1, 3, 5, 7, 9, and 11), the WES camera system imaged one set of features; during the even number periods (i.e., Passes 2, 4, 6, 8, 10, and 12), the system imaged a second set of features. The controller software allowed for highly accurate (exact) pointing angles and fine adjustment just prior to and during the mission if needed to maintain the same imaging areas as much as possible. IR imagery was collected on 12 selected terrain and target (vehicle) features. These 12 images were divided into two groups: the first group imaged seven terrain/target features in and around Site E, the second imaged three terrain features in the Site E area and Sites D and F. The measurement schedule was divided in this manner to ensure sufficient time to image all the 12 features in each sequence and to be prepared for the next sequence in less than 1 min.

Meteorological Measurements

WES deployed a meteorological station south of the Site A1 area to collect meteorological data for use in analyzing the WES imagery data and to help document the site conditions during the Grayling II field exercise. This station was configured to collect data at 5-min intervals on air temperature, relative humidity, soil temperature, barometric pressure, total solar radiation, net solar radiation (down-welling - reflected), wind speed and direction, snow depth and precipitation. The snow depth was measured using a new sensor manufactured by Campbell Scientific Canada Corporation. The sensor uses a sonar-type signal to measure depth over a range of 0.6 to 10 m and has an accuracy of ± 1 cm or 0.4 percent of the range and a resolution of 0.5 mm. The sensor has a 20-deg beam acceptance angle and operates over a temperature range from -25 to 50 °C. Data were telemetered to the WES data facility, where a graphical workstation was used to display the data in real time.

Soil Type Measurements

Samples for surface soils type characterization and analysis were not collected by WES during the Grayling II field exercise because samples had been collected from the same areas during the Grayling I exercise.[1] These samples were obtained from the Grayling I SWOE Sites C, D, E1, E2, F, and G. The location of Sites C, D, and F was repeated for the Grayling II exercise. Sites E1 and E2 were located in the 100- by 100-m square known as Site E; Site G was not used during the Grayling II exercise. The 1992 analysis revealed that the surface soils in the site were primarily dark gray

[1] Hahn, C. D. (1994). "Grayling I site characterization data summary," Technical Report prepared by the U.S. Army Engineer Waterwys Experiment Station, Vicksburg, MS, for the Smart Weapons Operability Enhancement Program Office, Hanover, NH.

silty sands (SP-SM). An organic material was also contained in the top 1-cm layer. The grain size results show that 90 percent of the particles ranged between 0.01 and 0.5 mm. The results of the Grayling I soil analysis are included in Appendix A.

Summary of Meteorological and Soil Temperature Instrumentation Measurements

Meteorological and soil temperature profile data were collected by CRREL and ARL-BED at each of the six SWOE sites (A1, C, D, E3, E4, and F) during the Grayling II field exercise.[1] In addition to this, apparent temperature data of terrain features were collected at Site D, soil surface temperature data were collected at Sites E3 and E4, while at Site C, instrumentation was deployed at three heights (2, 12, and 20 m). Instrumentation from ARL-BED, CRREL, and WES was used to collect this data. Table 6 shows the parameters collected at each site.

Table 6
Environmental Parameters Measured at SWOE Sites

Parameter	Site A1	Site C	Site D	Site E3	Site E4	Site F
Barometric Pressure	Yes	No	Yes	Yes	Yes	No
Air Temperature	Yes	Yes	Yes	Yes	Yes	Yes
Relative Humidity	Yes	Yes	Yes	Yes	Yes	Yes
Wind Speed	Yes	Yes	Yes	Yes	Yes	Yes
Wind Direction	Yes	Yes	Yes	Yes	Yes	Yes
Visibility	Yes	No	Yes	Yes	Yes	No
Rain Rate	No	No	Yes	Yes	Yes	Yes
Accumulative Rain Amount	No	No	Yes	Yes	Yes	Yes
Total Solar Flux (0.3 to 3.0 μm)	Yes	Yes	Yes	Yes	Yes	Yes
Diffuse Up Welling Solar Flux (0.3 to 3.0 μm)	No	Yes	Yes	Yes	Yes	Yes
Down Welling IR Flux (3 to 50 μm)	Yes	Yes	Yes	Yes	Yes	Yes
Up Welling IR Flux (3 to 50 μm)	No	Yes	Yes	Yes	Yes	Yes

(Continued)

[1] SWOE. (1994). "Field activities plan, Grayling II, 4 March - 15 April 1994," U.S. Army Engineer, Cold Regions Research and Engineering Laboratory, Hanover, NH.

Table 6 (Concluded)

Parameter	Site A1	Site C	Site D	Site E3	Site E4	Site F
Staring Radiometer Data[1]	No	No	No	Yes	Yes	No
Soil Temperature Profile	No	Yes	Yes	Yes	Yes	Yes
Soil Surface Temperature	No	No	No	Yes	Yes	No
Soil Surface Moisture	Yes	Yes	Yes	Yes[2]	Yes[2]	Yes
Snow Characterization	Yes	Yes	Yes	Yes[2]	Yes[2]	Yes
Feature Temperature	No	No	Yes	No	No	No

[1] Two staring radiometers were deployed at Sites E3 and E4 to simulate the view geometry of the ARL-BED/CRREL and EAFB TIPS imaging systems to measure differences caused by view geometry.
[2] Only one soil moisture and snow characterization measurement was made daily at Site E.

WES collected surface temperature data at Sites E3 and E4 and feature temperature data at Site D. ARL-BED was responsible for collecting meteorological data at Sites A1, C, and D and all upper air data as well as official daily weather observations. CRREL was responsible for collecting meteorological data at Sites E3, E4, and F as well as soil temperature profile data at Sites C, D, E3, E4, and F. All instrumented data were collected at 1-min intervals except for the feature temperature data, which was sampled at 5-min intervals. Both WES and CRREL were responsible for collecting daily soil moisture data at each of the five sites (A1, C, D, E, and F). All data were either transferred or made available for transfer to the SWOE DMT (via the network).

3 Data Presentation

As stated earlier, the objective of the SWOE Grayling II exercise was to capture the full range of environmental conditions during the winter-to-spring thaw period in Michigan. Prior to the exercise, abnormally high temperature thawed the existing snow, but a cold front immediately before starting data collection blanketed the area with approximately 25 cm of new snow (23 February 1994). At the start of the data collection period (4 March), some of this snow had begun to melt, and some areas of bare soil/brown grass were visible. A few days into the data collection, this snow had almost completely melted. Several smaller winter storms passed through the region, resulting in 2 to 12 cm of snow. A couple of rainstorms also passed through the region during the exercise. Approximately one-third through the exercise, the combination of melting snow and frozen ground produced many shallow ponds of water throughout the area. During one nighttime mission, a target was located in one of these ponds; calm weather conditions allowed for a dominant reflection of the target from the water surface. This reflection was very detectable in the IR imagery. Abnormally cold conditions during the winter, however, delayed the onset (greening up) of spring, and most of the vegetation was still in its dormant (brown color) state at the end of the Grayling II exercise (15 April). Some of the grass near Site D showed new growth near the roots; however, this new growth was masked by the dormant growth and was not visible to the visible or IR cameras because of the viewing geometries (i.e., low grazing angles) of the imaging systems.

Site Characterization by Mission

Site conditions (i.e., dynamics) varied considerably during the 43-day SWOE JT&E Grayling II exercise. At the beginning of the exercise (4 March), the area had been recently blanketed by a heavy snowfall (Figure 8). By mission 16, conditions changed to more of a patchy snow cover with large areas of exposed soil and dormant grasses visible throughout the area (Figure 9). Some new snow fell prior to mission 22 (9 March); however, sunny conditions began to melt the newly fallen

snow. Patchy conditions continued until mission 36 (12 March), when the area was once again blanketed by a heavy snowfall. Patchy snow cover resumed about mission 42 (14 March), and the snow continued to melt through mission 56 (17 March). Snow began falling again after mission 56 and continued falling and accumulating throughout mission 58. Complete snow cover (100 percent) conditions persisted until about mission 67 (20 March). Significant melting occurred after mission 67; by mission 75 (22 March), large areas of standing water occurred, which were quite visible throughout the area, and as much as 30 percent of Site E and the surrounding area contained surface water (Figure 10). During mission 76 (22 March), a target vehicle that had been placed on the road was surrounded by water approximately 1 ft deep. Reflected mirror images of the vehicle were clearly visible in the IR imagery (see Figure 11). By mission 77 (23 March), much of the surface water had disappeared (i.e., had either run off or been absorbed into the ground), but large areas still contained surface water. Patchy areas of melting snow continued to produce surface water. Snow again fell prior to mission 96 (27 March), and the area was blanketed by new snow. However, sunny conditions prevented the snow from staying very long, and by later that day (mission 98), much of the snow had again melted. Patchy snow areas were present until about mission 122 (3 April) when most of the area was without any snow. New snow again fell before mission 130 (5 April). Patchy conditions resumed about mission 136 (6 April). By the following day (mission 138), most of the snow had melted, and by mission 148 (9 April), the area was almost without any snow (Figure 12). Conditions remained snow free until the end of the exercise; however, new snow began to fall on the morning of 16 April, the day after the last mission.

Plant Characterization Data

In October 1993, WES visited Grayling to collect additional imagery and to obtain additional characterization data on the vegetation (grasses, trees, and shrubs). Over 1,200 trees and shrubs were characterized by location (x, y, z coordinates), species, and plant height and crown diameter. Additional information was also recorded to relate trees surveyed during the Grayling I exercise to the new survey for Grayling II and other comments relating to the modeling of the particular plant. Of plants measured in the valley, 73 percent were deciduous (oak) trees and shrubs, 24 percent were coniferous (pine), and 3 percent were wild cherry. Figure 13 shows the distribution of trees and shrubs by species category. The deciduous (oak) trees covered approximately 49 percent of the area covered by trees and shrubs with the coniferous (pine) covering almost 50 percent. Wild cherry covered 1.4 percent of the shrub-covered terrain. Figure 14 shows this distribution. In terms of height, almost 30 percent of the trees and shrubs were between 1 and 2 m, with an additional 25 percent being less than a meter. Approximately 5 percent were 10 m high or taller. Distribution by plant height is included in Figure 15. Plant characterization data are presented in Appendix B. These data and the data collected during

Grayling I were used to compile the overall information database for Grayling II for generation of synthetic scenes.[1]

SWOE Instrumentation and Feature Survey

WES surveyed each participant's deployed instrumentation and other man-made objects/features in the area. Additional features were surveyed during the exercise as requirements changed, and new background man-made features were added. Approximately 240 features were surveyed. The WES survey was based on control points established during October 1993. A plot of some of the survey data is shown in Figure 1; the annotated x-y-z positions for all instrumentation and features are included in Appendix C.

Soil Surface Temperature Data

Tables 7 and 8 show the maximum and minimum temperatures recorded from the 16 thermistors deployed at Sites E3 and E4.

Table 7
Minimum and Maximum Temperatures at Site E3

Thermistor	Minimum Temperature °C	Maximum Temperature °C	Thermistor	Minimum Temperature °C	Maximum Temperature °C
1	-5.35	22.70	9	-8.15	21.68
2	-8.06	21.32	10	-5.60	14.93
3	-7.16	18.83	11	-7.65	22.29
4	-5.15	17.47	12	-4.92	22.11
5	-6.16	22.28	13	-7.75	21.27
6	-4.32	16.38	14	-8.37	22.59
7	-5.18	16.15	15	-4.55	13.14
8	-7.29	23.42	16	-6.04	17.82

[1] Ballard, J. R., Jr. (1994). "Grayling II information base for generation of synthetic thermal infrared scenes," Technical Report prepared by the U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS, for the Smart Weapons Operability Enhancement Program Office, Hanover, NH.

Table 8
Minimum and Maximum Temperatures at Site E4

Thermistor[1]	Minimum Temperature, °C	Maximum Temperature, °C	Thermistor[1]	Minimum Temperature, °C	Maximum Temperature, °C
1	-8.74	27.89	9	-11.53	30.14
2	-9.26	19.83	10	-9.13	23.74
3	-8.56	22.07	11	-10.22	23.02
5	-6.81	29.19	12	-9.58	39.81
6	-9.48	22/69	13	-10.17	22.92
7	-8.33	20.75	14	-8.88	28.47
8	-9.24	24.24	15	-9.24	26.29

[1] Thermistors 4 and 16 at Site E4 were not functional during the Grayling II exercise, so the data were deleted from this table. Because of restrictions concerning access to the site and frozen ground conditions, no attempt was made to repair these sensors.

At Site E4, problems developed with thermistors 4 and 16. WES was unable to repair these sensors because of frozen soil conditions and restricted access to avoid disturbing the site (i.e., snow surface). The minimum measured difference between the 16 thermistors deployed at Site E3 was 0.6 °C; the maximum difference recorded was 16.7 °C. The mean difference was 2.7 °C with the standard deviation of 2.6 °C. At Site E4, the minimum difference was 0.3 °C; the maximum difference was 44.2 °C. The mean difference was 6.0 °C, and the standard deviation was 4.4 °C. An additional analysis was done to determine whether the E3 and E4 sites were statistically the same during the 43-day exercise. A T-test was conducted on these data to test the hypothesis that the means of the paired difference between the two sites were not statistically different from 0. This analysis revealed that for over 50 percent (50.8 percent) of the time, the means of the differences were not statistically different from 0 ($\alpha = 0.05$). A plot showing this analysis is included in Figure 16. These data were graphed daily to produce 24-hr summaries. An example of this summary is shown in Figure 17. The hatch boxes designate the data collection periods. A full set of these summaries is included in Appendix D.

Soil Moisture Data

When possible, two soil samples were collected daily at each site to determine a soil moisture for depth layer 1 (1 to 2 cm) and for depth layer 2 (5 to 7 cm). The samples were collected from random locations, provided

the location had less than 2 cm of snow and the ground was thawed. Table 9 presents the minimum and maximum percentage moisture for each depth at each site and the number of shallow and deep samples collected at each site. A complete summary of the soil moisture data is included in Appendix E.

Table 9
Summary of Soil Moisture Data

Site	Number Layer 1 Samples	Number Layer 2 Samples	Minimum Layer 1 Moisture %	Minimum Layer 2 Moisture %	Maximum Layer 1 Moisture %	Maximum Layer 2 Moisture %
A1	12	10	6.1	7.8	30.9	28.8
C	10	7	13.7	69.6	69.6	61.7
D	19	15	4.1	6.0	25.7	13.2
E	17	15	4.6	8.9	43.3	31.9
F	21	14	6.5	8.4	29.8	23.1

Feature Apparent Temperature Data

Table 10 shows the maximum and minimum temperatures measured at Site D for each of the staring radiometers (two arrays of eight staring radiometers) deployed to measure the apparent temperature of terrain features. These sensors were configured to collect samples at 5-min intervals. These data were plotted to produce 24-hr summaries. Data are included in Appendix F.

Snow Cover Data

A total of 117 CCD and color video images were collected and processed to depict the snow cover characteristics in the vicinity of Site E and a portion of the valley. The first image of each image pair was transmitted back to WES for processing using telecommunication software. Problems with the quality of telephone lines and limited telecommunications software necessitated transferring most of the data (approximately 60 percent of the images) on floppy disks using express mail. The imagery was processed, and a snow cover map was produced for most daytime missions. These maps are included in Appendix G.

Table 10
Minimum and Maximum Apparent Temperatures at Site D

Channel	Feature	Minimum Temperature, °C	Maximum Temperature, °C
D1-1	East Side Of Tree Trunk	-17.88	25.62
D1-2	South Side of Tree Trunk	-17.91	31.13
D1-3	West Site of Tree Trunk	-17.54	33.11
D1-4	Small Bush	-25.49	27.06
D1-5	Grassy Area 1	-24.54	31.04
D1-6	Grassy Area 2	-19.52	32.07
D1-7	Shaded Small Scrub Vegetation	-24.85	36.55
D1-8	Unshaded Small Scrub Vegetation	-25.40	30.79
D2-1	Grassy Area 1	-23.74	27.95
D2-2	Scrub Oak 1	-24.01	22.17
D2-3	Scrub Oak 2	-23.96	25.17
D2-4	Grassy Area 2	-21.38	28.98
D2-5	Large Scrub Oak	-20.62	28.78
D2-6	Assorted Small Brush	-25.56	30.39
D2-7	Hillside Grasses and Small Scrub	-24.61	28.65
D2-8	Sandy Soil Area	-23.01	26.84

High-Resolution Imagery Data

WES collected high-resolution imagery data on 12 terrain/target features in and around Sites E, D, and F. The terrain/target features imaged are listed in Table 11. Figures 17-28 present the sample shortwave (SW), long-wave, and visible (35mm) imagery of each image. Each of these features was imaged six times during the 1-hr mission. Data were collected during 139 of the 172 scheduled SWOE missions. Because of a mechanical failure of the camera mount, only limited data were collected on 16 missions. An alternate mount was constructed that permitted gathering data on only one feature, the snow feature (Image 8). WES also conducted a diurnal imaging session 4-5 March 1994 for the generation of texture data for snow. WES processed images 3, 4, 6, 8, and 12 for the first pair of passes (1-min sampling period), the middle pair of passes, and the final pair of passes at the end of each mission to produce data to generate image texture for the synthetic scenes. A detailed analysis of the imagery collected is presented in another report.[1]

[1] Rivera, S., Jr. (1994). "Analysis of thermal imagery collected at Grayling II, Grayling, Michigan," Technical Report prepared by the U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS, for the Smart Weapons Operability Enhancement Program Office, Hanover, NH.

Table 11
Features Imaged

Feature Number	Image East	Coordinates North	Feature Description
1	687263	4951805	Test track with and without target vehicles
2	687248	4951865	Grassy area with and without target vehicles
3	687298	4951844	Coniferous treeline with and without target vehicles (with some missions, No vehicles)
4	687250	4951922	Grassy area
5	687196	4951924	Coniferous scrub brush
6	687326	4951925	Coniferous treeline
7	687230	4951933	Multistem large leafless oak tree
8	687205	4951931	Grassy area used for snow texture
9	687424	4952028	Coniferous treeline against sloping hillside with some bare soil and one target hulk
10	687316	4952009	Grassy area
11	687940	4952686	Site F (grasses)
12	687356	4952441	Site D

Meteorological Data

Meteorological data collected by WES were used for some WES analysis (these data were not transferred to the SWOE DMT and are not part of the SWOE Grayling II database). Conditions during the Grayling II exercise were quite dynamic. Prior to the start of data collection activities, site conditions were extremely cold (windchills in excess of -20 °F)[1] with a deep snow cover on the ground. There were many thaw periods during the exercise where the majority of the snow would melt before the next snowfall. Air temperature ranged from -20.00 to 20.11 °C, and relative humidity ranged from 20.6 to 97.8 percent. Barometric pressure ranged from 960 to 1,010 mb. Wind speed ranged from calm (0 m/s) to nearly 30 m/s. WES data were graphed as 24-hr summaries and are included in Appendix H.

[1] To obtain Celsius (C) temperature readings from Fahrenheit (F) readings, use the following formula: C = (5/9) (F - 32).

Quality Control and Electronic Transfer of Data

All WES data received an intensive quality check prior to being made available to the SWOE DMT. Surface temperature and feature temperature data were processed through a variety of quality control procedures previously described, as well as a visual (graphical) check of the collected data versus time. Image data were analyzed visually prior to capture to ensure that the dynamic range was properly set and that the cameras were pointing in the proper direction (azimuth and elevation). Survey data were verified by checking computed coordinates for the control points against previously determined coordinates and by ensuring that the survey was properly closed out by resurveying the initial backsite points. Soil moisture data were checked by calibrating the electronic balance prior to each weighing session and double checking numbers received to prevent errors. Results were also compared with those calculated by CRREL personnel. Once the quality control process was completed, all data were placed in a directory on the WES central file server computer where they were picked up (electronically transferred) by the DMT as needed. This proved to be much more efficient than previous methods of physically transferring the data using floppy or Bernoulli disks. All data collected by WES were thus transferred using the network. All data collected during the SWOE Grayling II exercise will be available through the SWOE JT&E Program Office. WES data were also placed in the WES archive.

4 Summary

WES employed standard site characterization procedures to document the conditions during the SWOE JT&E Grayling II exercise. WES collected a variety of environmental data to describe the conditions present during the exercise. Data collected were the 16,000 plus thermal image data sets, thermal data on soil surface temperature at two sites (Sites E3 and E4), and feature temperatures at Site D. Soil surface temperature data were recorded at a rate of one record (16 samples) per minute for 43 days (≈62,000 data records), while the feature temperature data were recorded at two arrays at a rate of one record (eight samples) every 5 min for the 43-day period (≈12,384 data records/array or ≈24,768 total data records). WES also collected daily soil moisture data at each of five sites using a gravimetric or oven-drying technique. The random technique used to sample soil moisture made it difficult to separate the differences associated with the temporal and spatial variability. A better approach may have been to include more random samples per site and to make better use of automated soil moisture probes where possible. WES characterized approximately 1,200 trees and shrubs in the primary imaging area and surveyed the locations of all the SWOE instrumentation, fiducial arrays, targets, and other important features and objects. Data obtained during the SWOE JT&E Grayling II field exercise were transferred to the SWOE DMT via an electronic network.

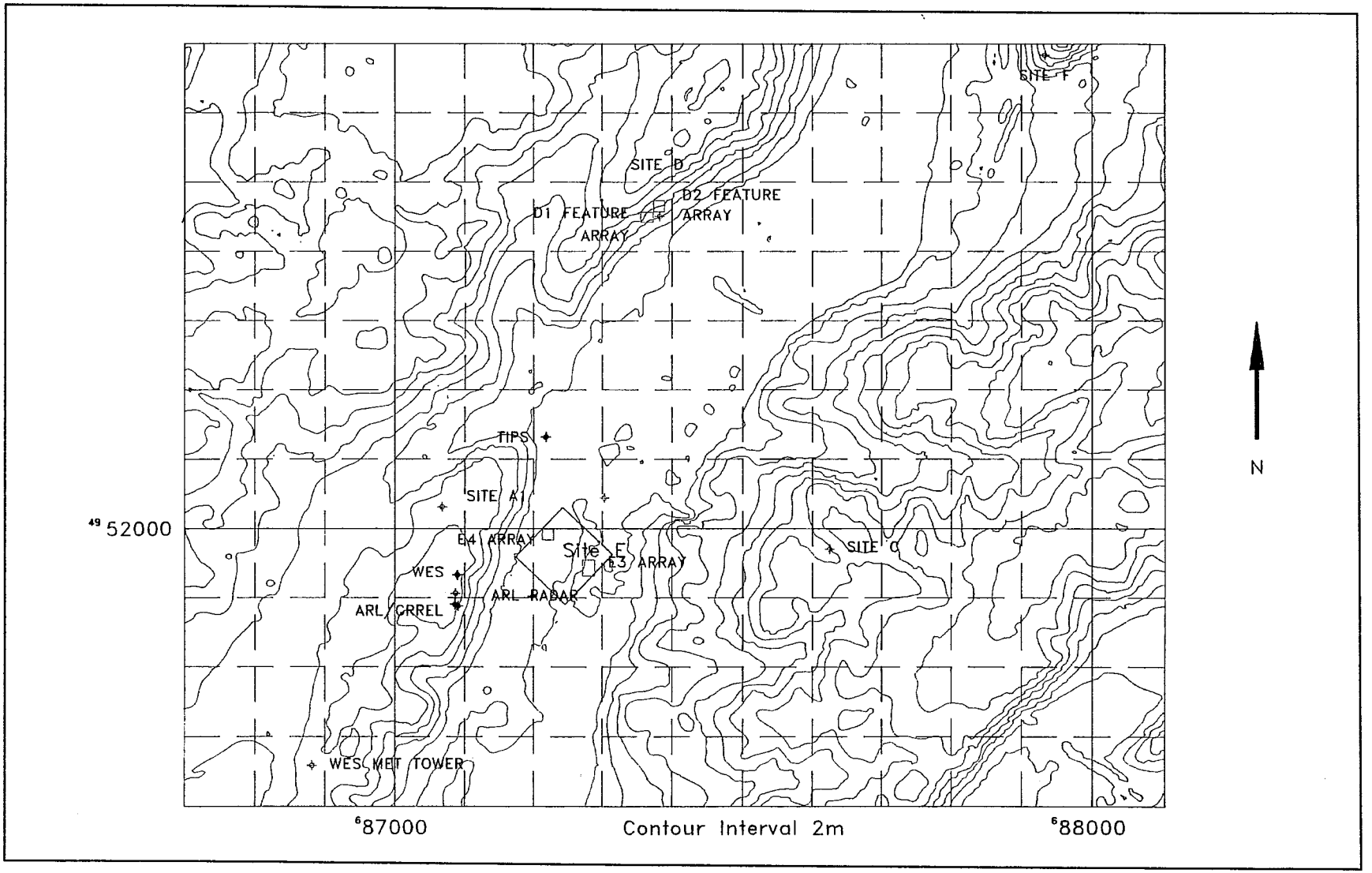


Figure 1. Grayling II site layout

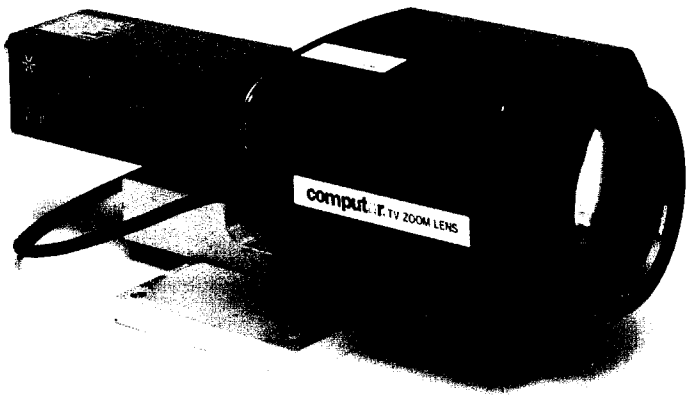


Figure 2. WES video camera

Figure 3. Photometrics CCD camera

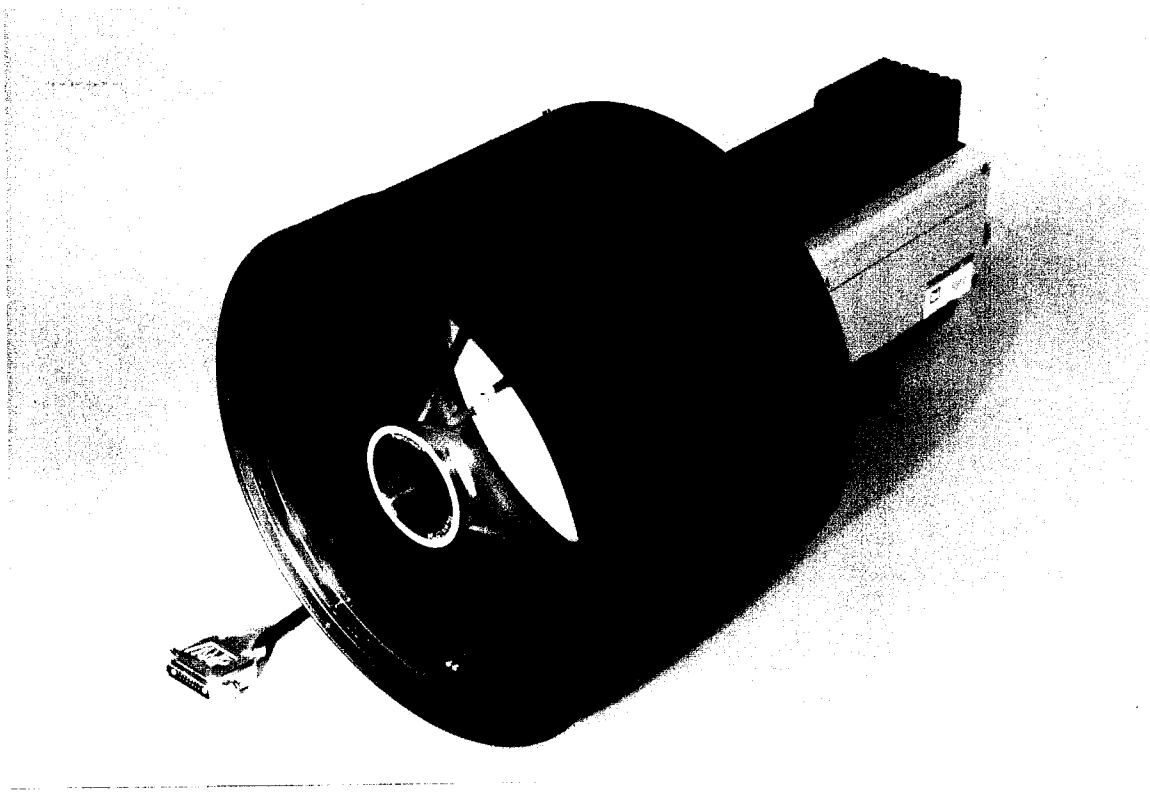


Figure 4. Agema 900 SW scanner with 2.5-deg FOV lens

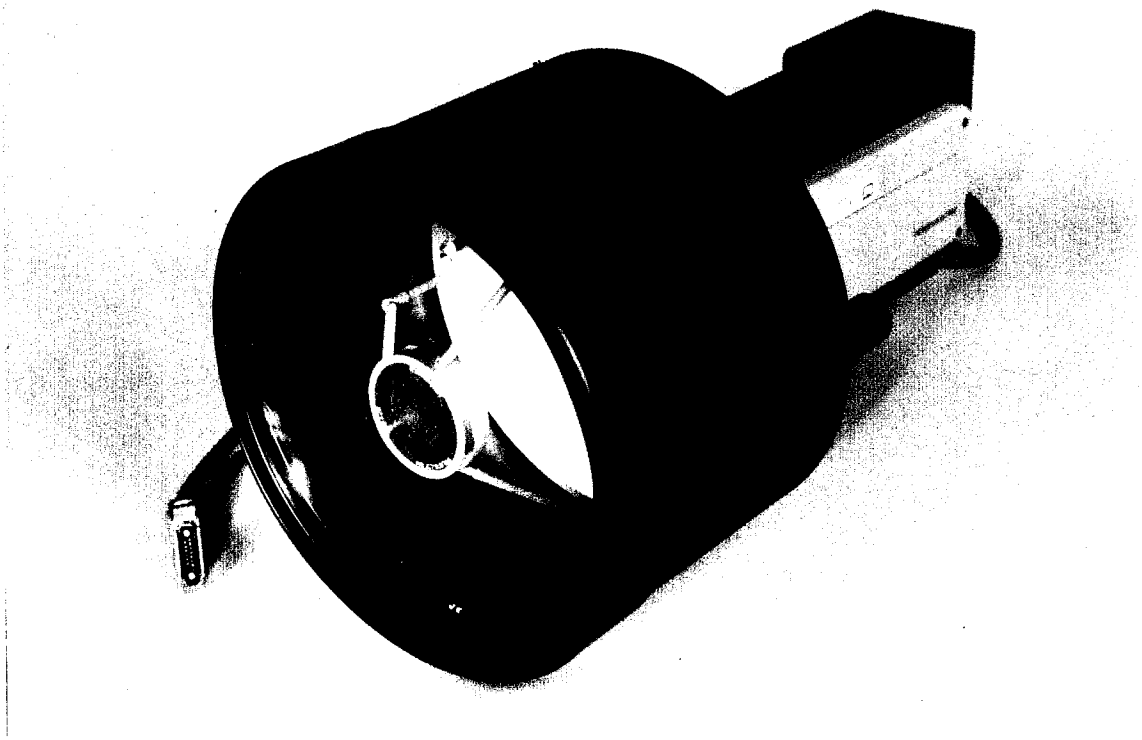


Figure 5. Agema 900 LW scanner with 2.5-deg FOV lens

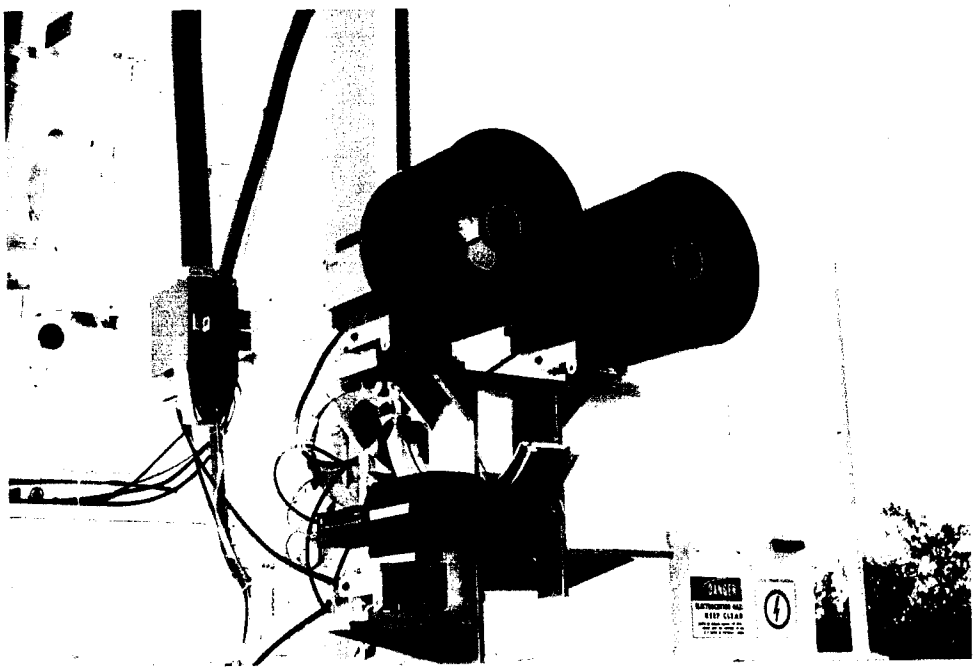


Figure 6. WES computer-controlled pan and tilt mount

Figure 7. WES boom truck

Figure 8. Data collection area with heavy snow cover

Figure 9. Patchy snow cover condition on 1 April

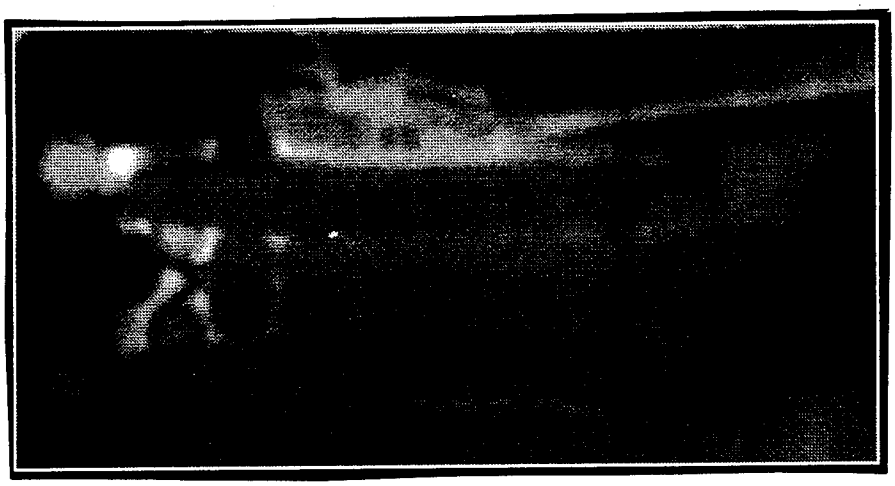


Figure 10. Target T-72, Mission 76, reflected in surface water

Figure 11. Standing water in and around Site E

Figure 12. No snow condition

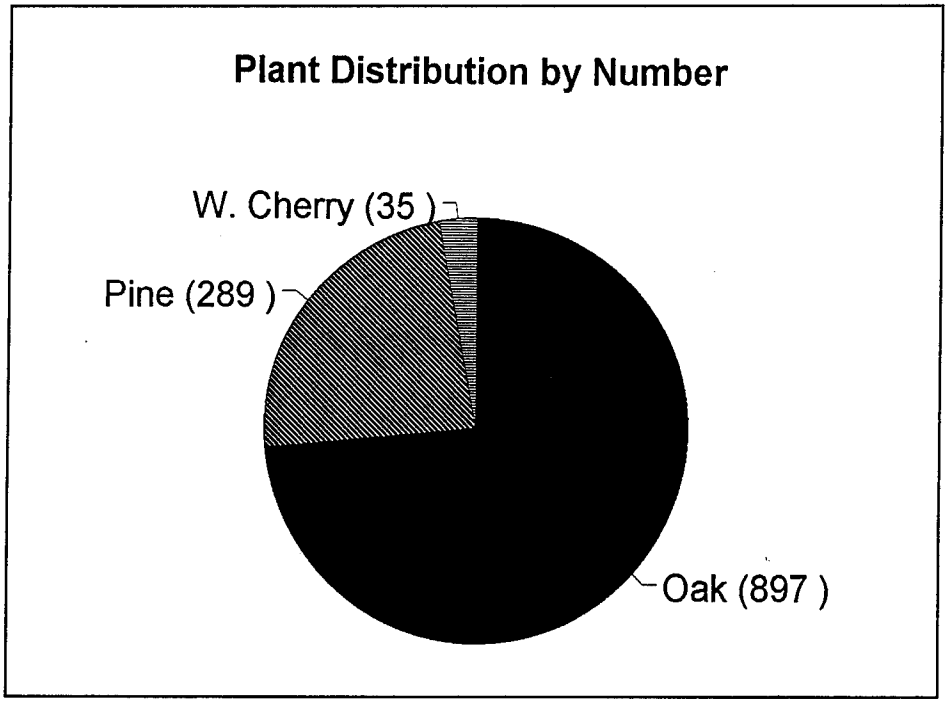


Figure 13. Large plant distribution by population

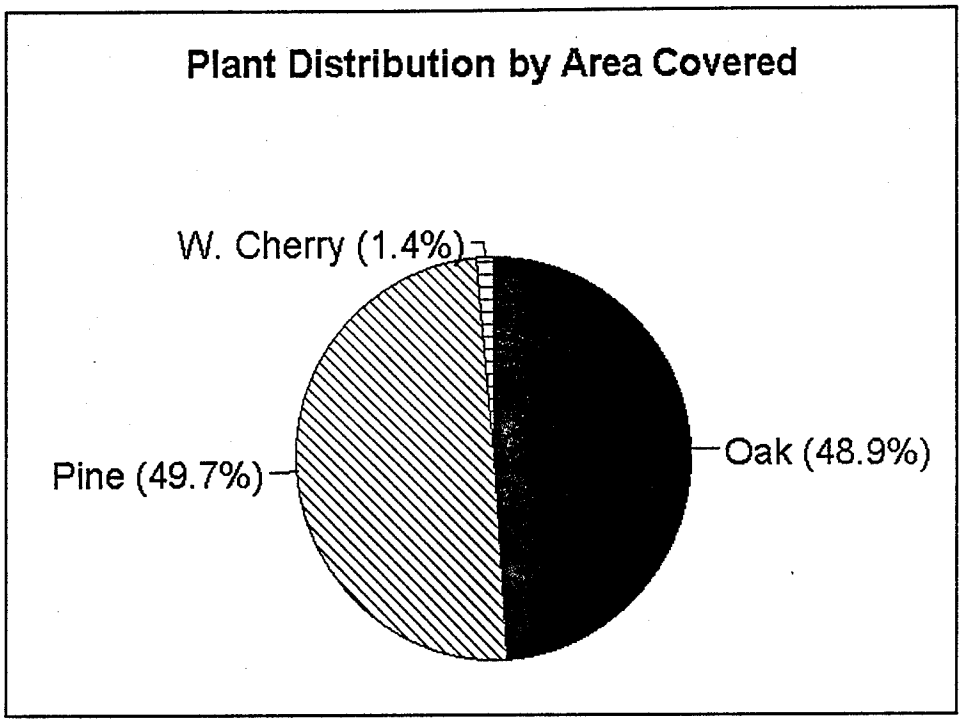


Figure 14. Plant distribution by area covered

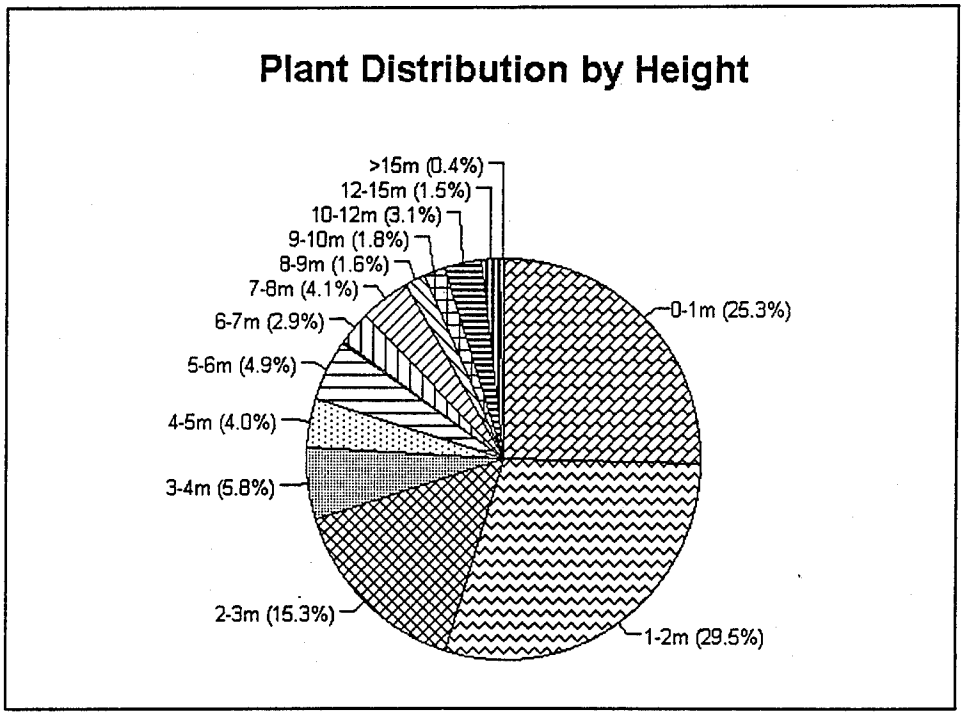


Figure 15. Plant distribution by height

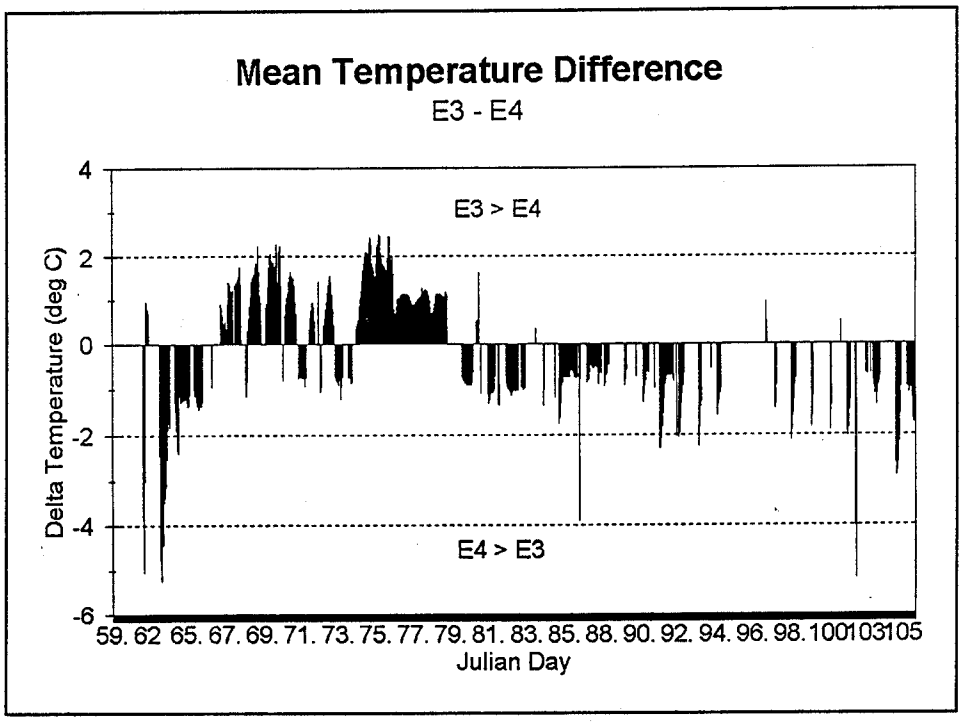


Figure 16. Analysis of difference between Sites E3 and E4

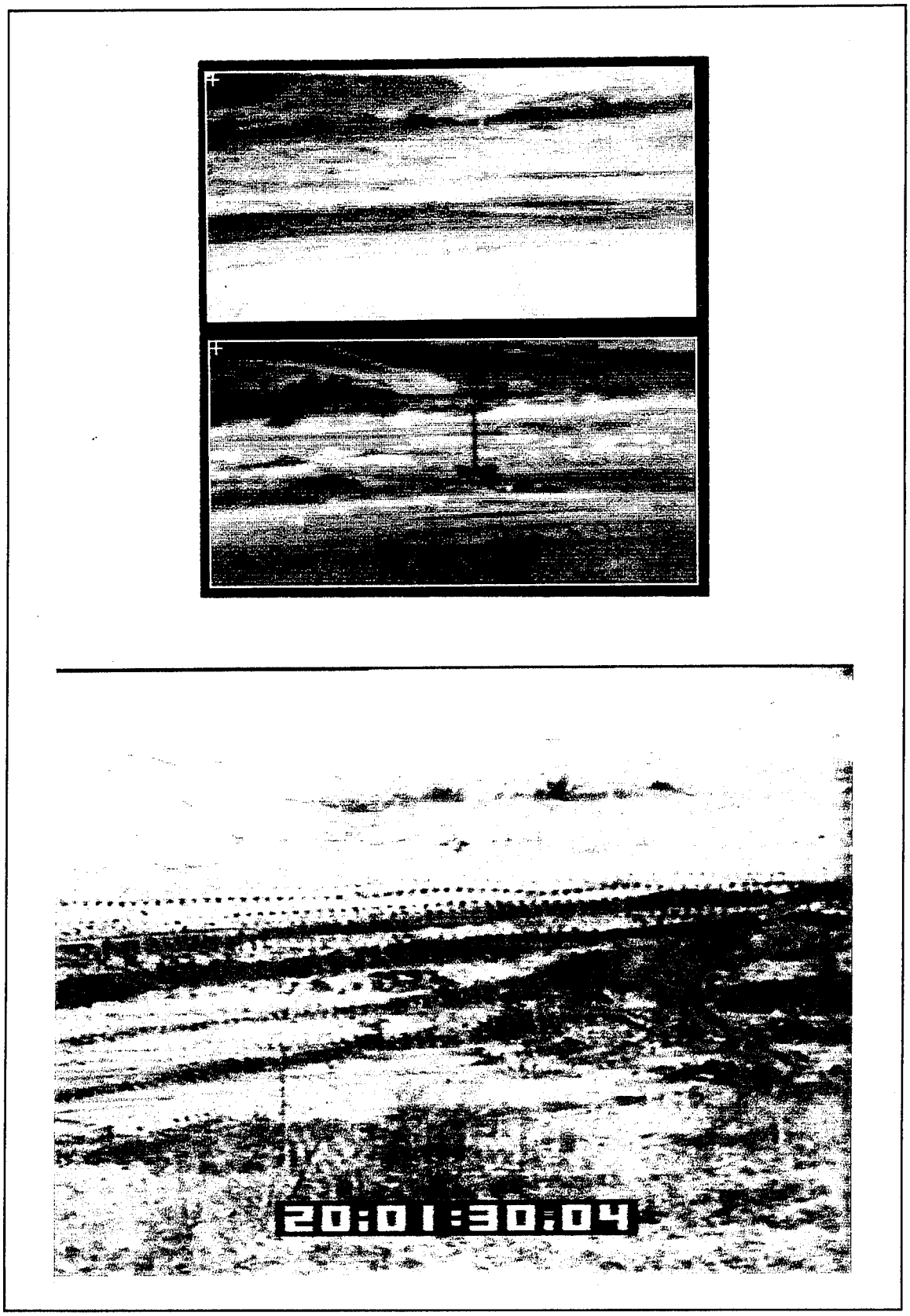


Figure 17. WES high resolution feature 1, SWIR, LWIR, and visual imagery

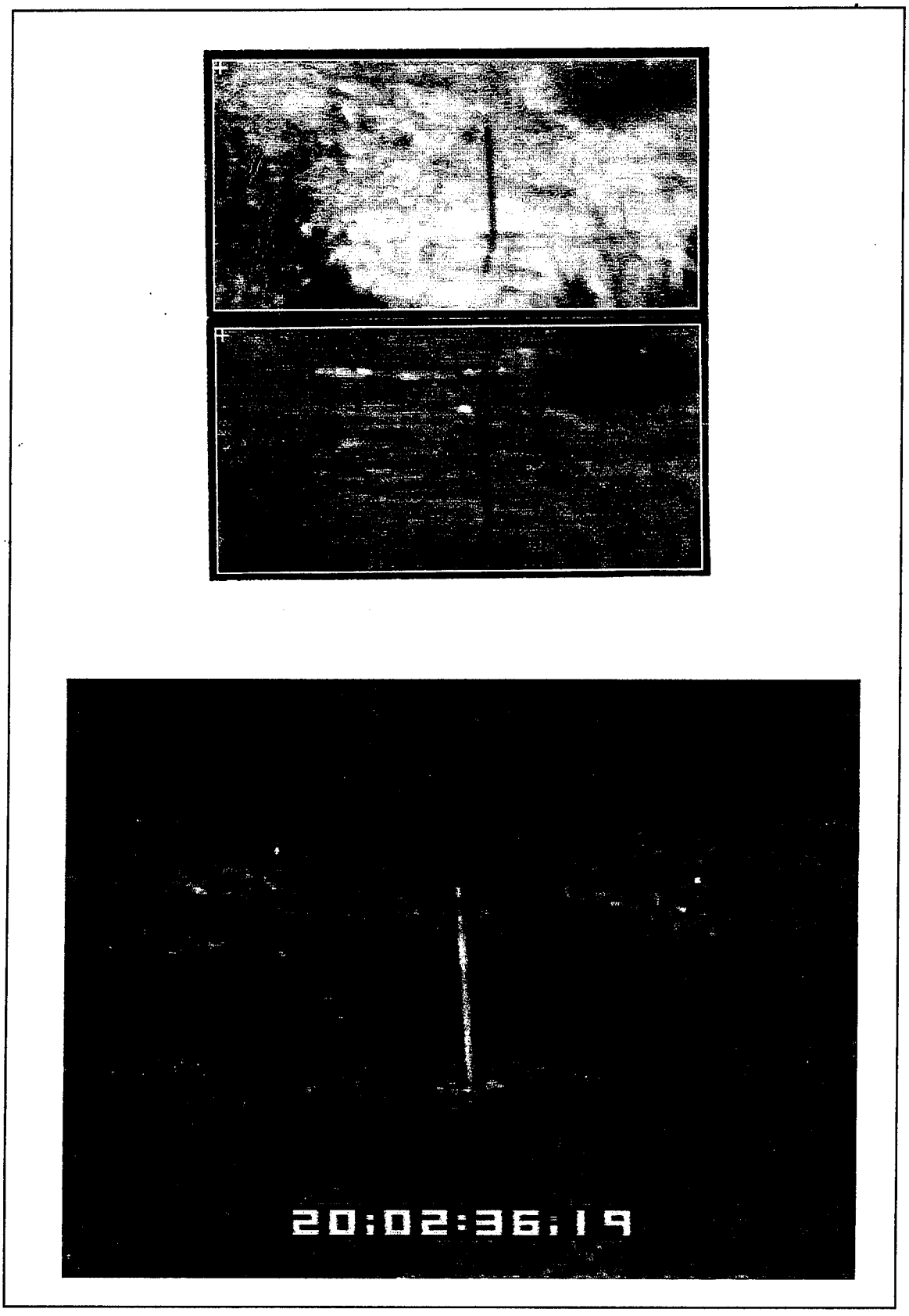


Figure 18. WES high resolution feature 2, SWIR, LWIR, and visual imagery

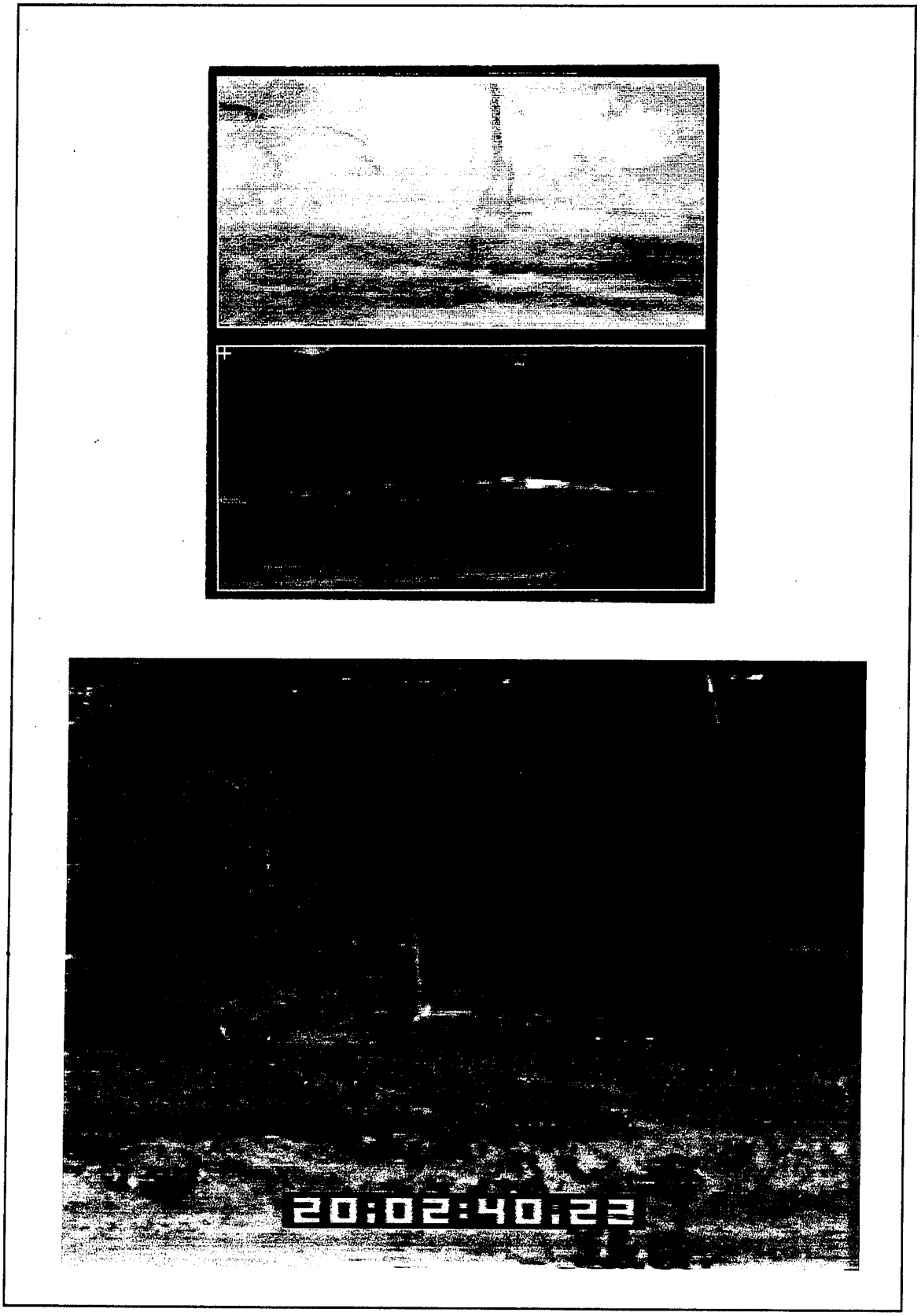


Figure 19. WES high resolution feature 3, SWIR, LWIR, and visual imagery

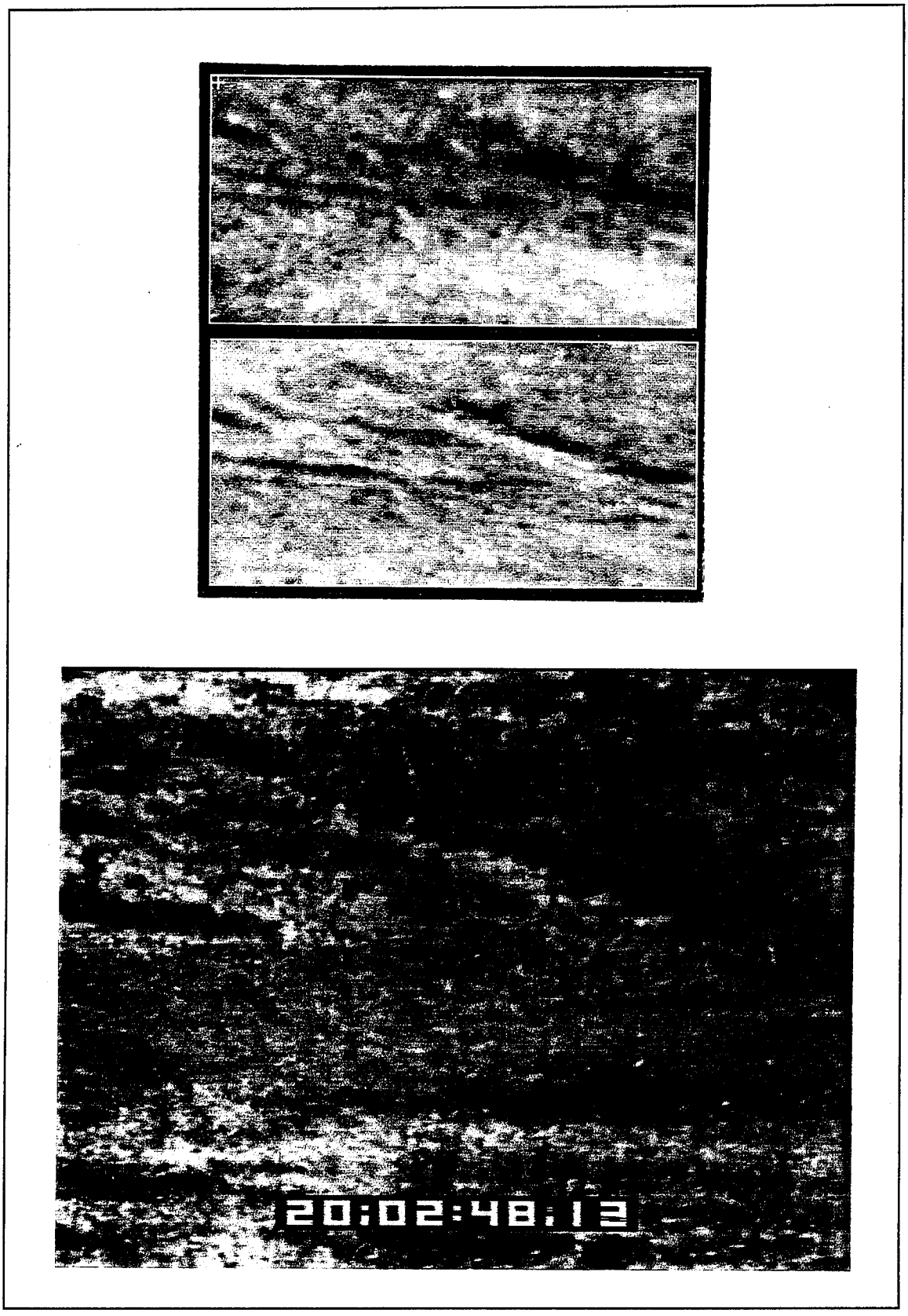


Figure 20. WES high resolution feature 4, SWIR, LWIR, and visual imagery

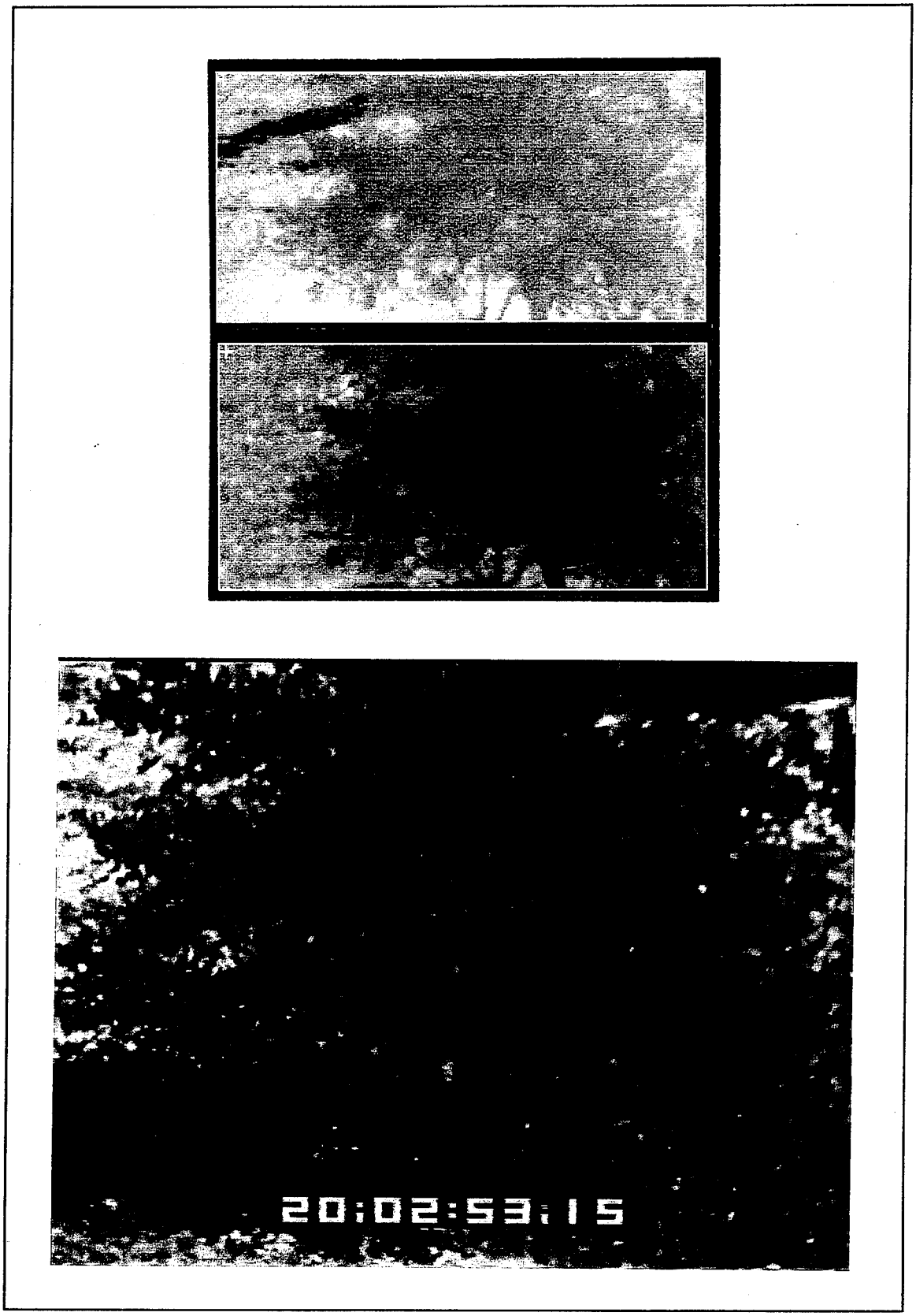


Figure 21. WES high resolution feature 5, SWIR, LWIR, and visual imagery

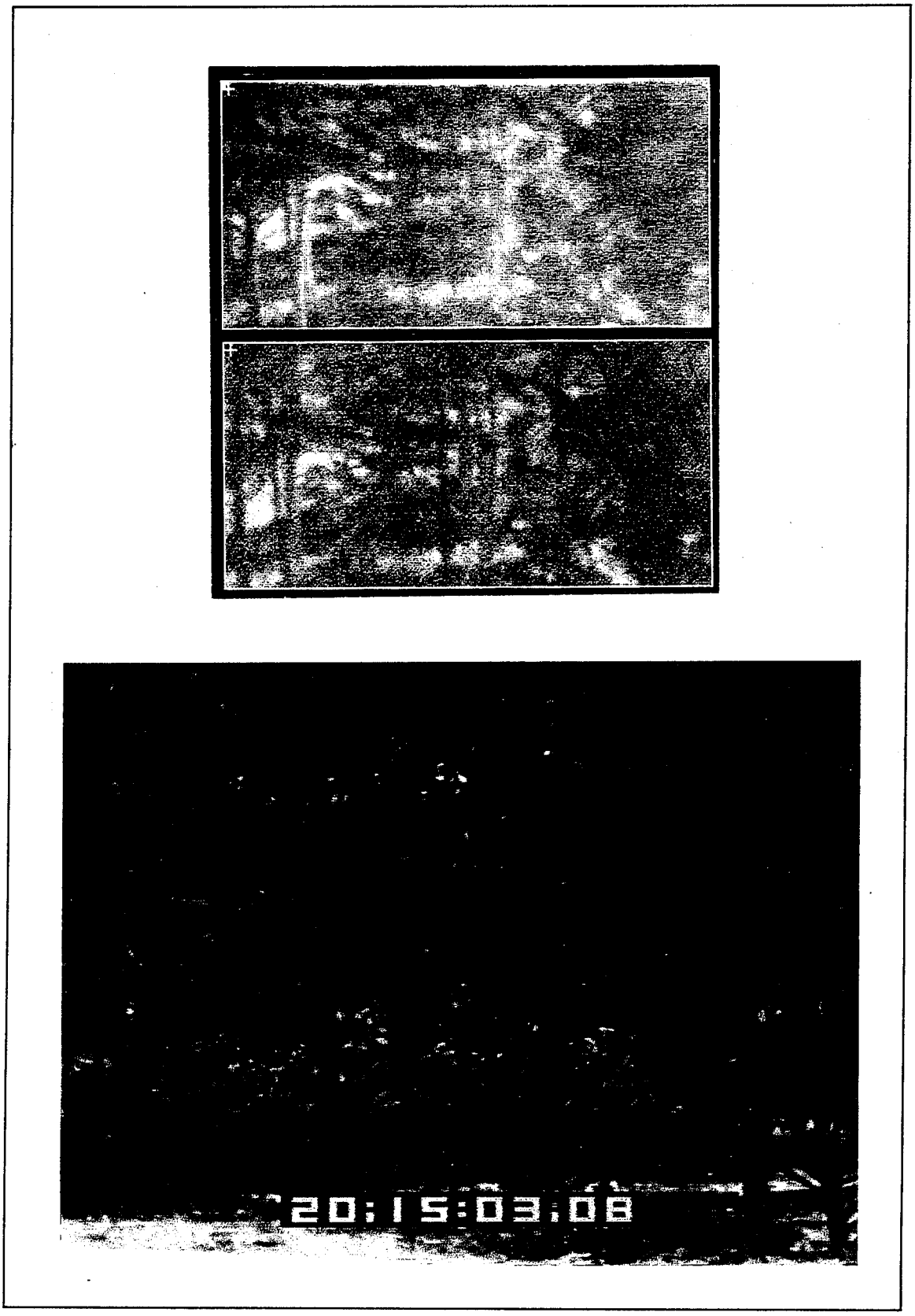


Figure 22. WES high resolution feature 6, SWIR, LWIR, and visual imagery

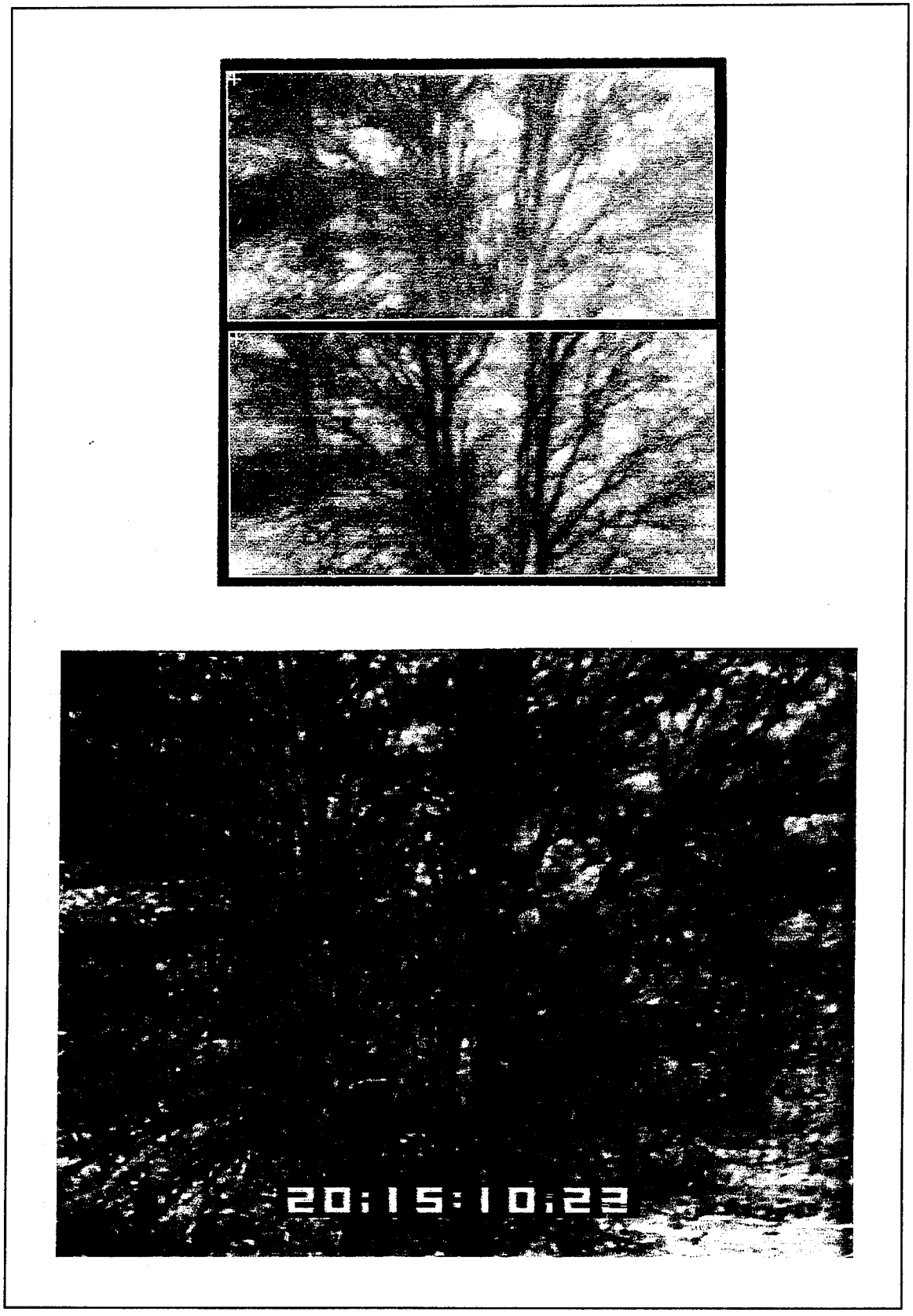


Figure 23. WES high resolution feature 7, SWIR, LWIR, and visual imagery

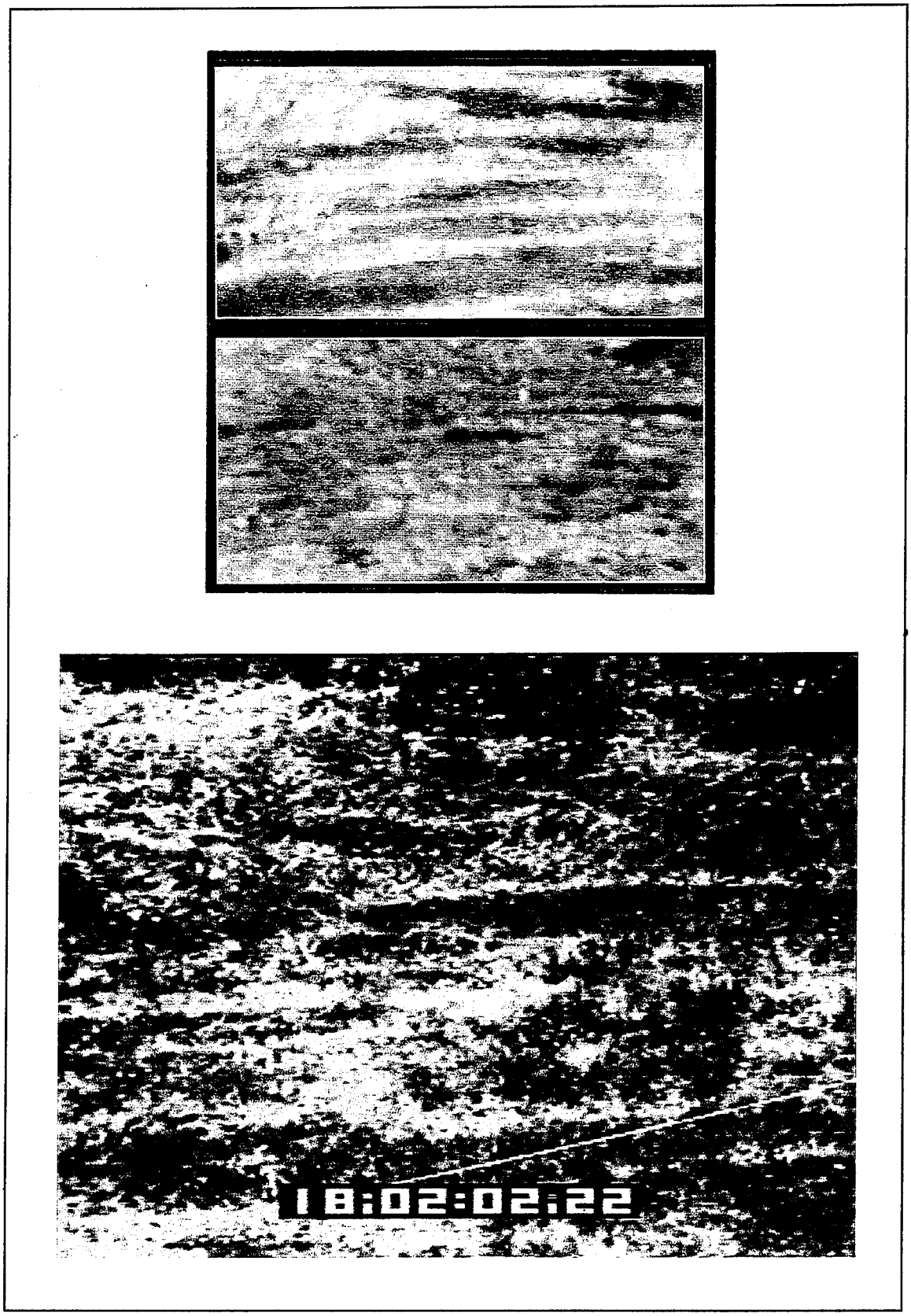


Figure 24. WES high resolution feature 8, SWIR, LWIR, and visual imagery

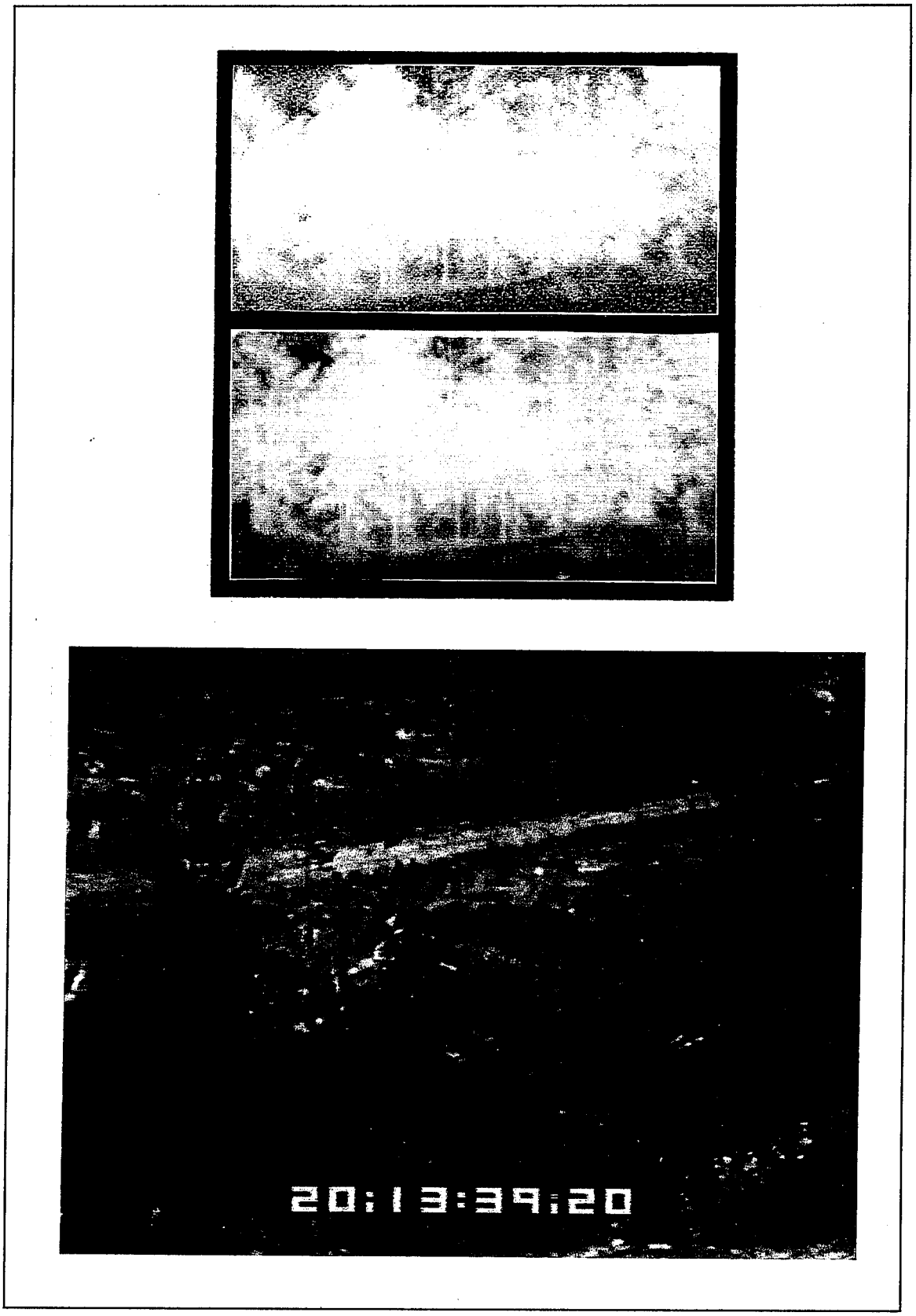


Figure 25. WES high resolution feature 9, SWIR, LWIR, and visual imagery

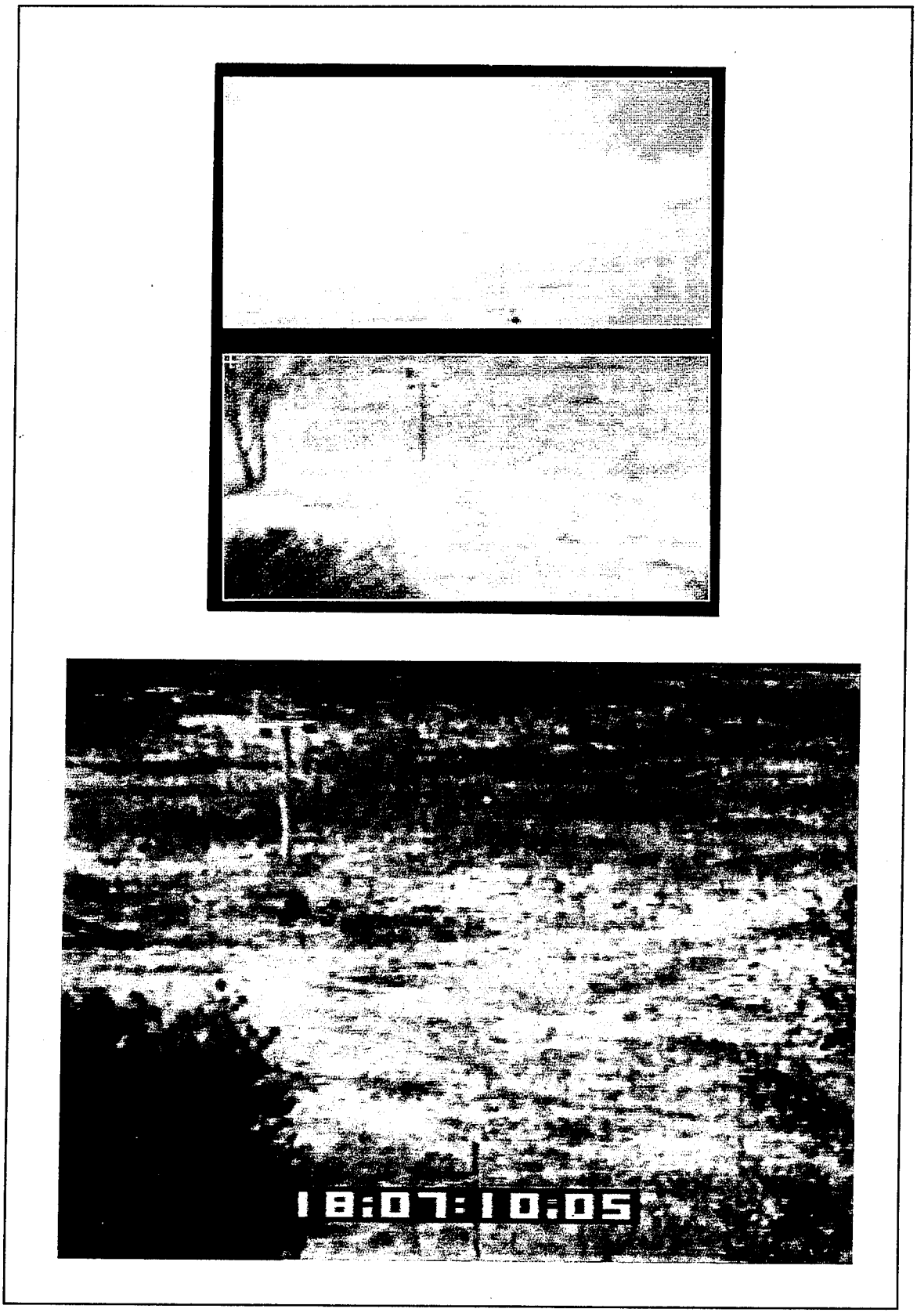


Figure 26. WES high resolution feature 10, SWIR, LWIR, and visual imagery

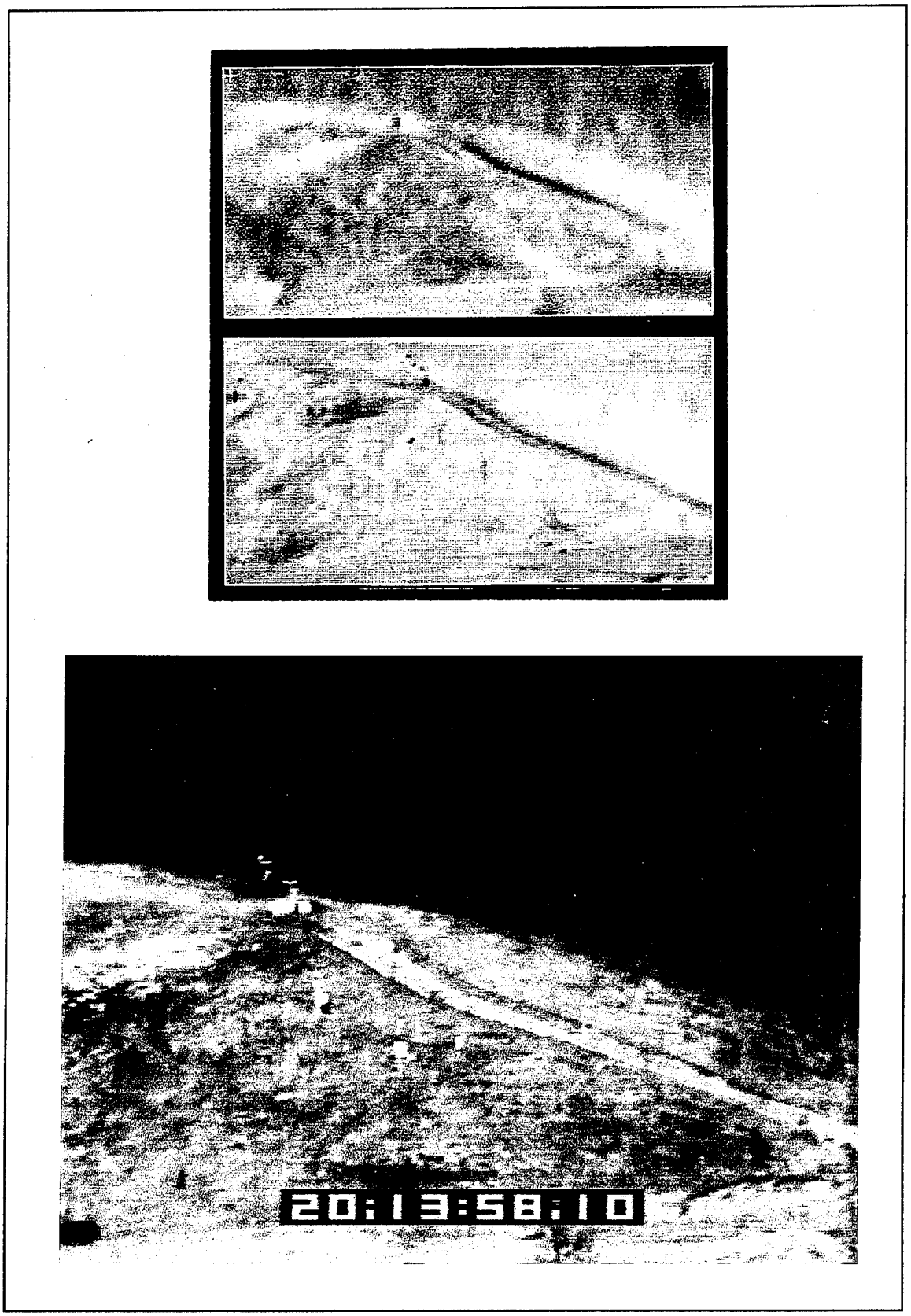


Figure 27. WES high resolution feature 11, SWIR, LWIR, and visual imagery

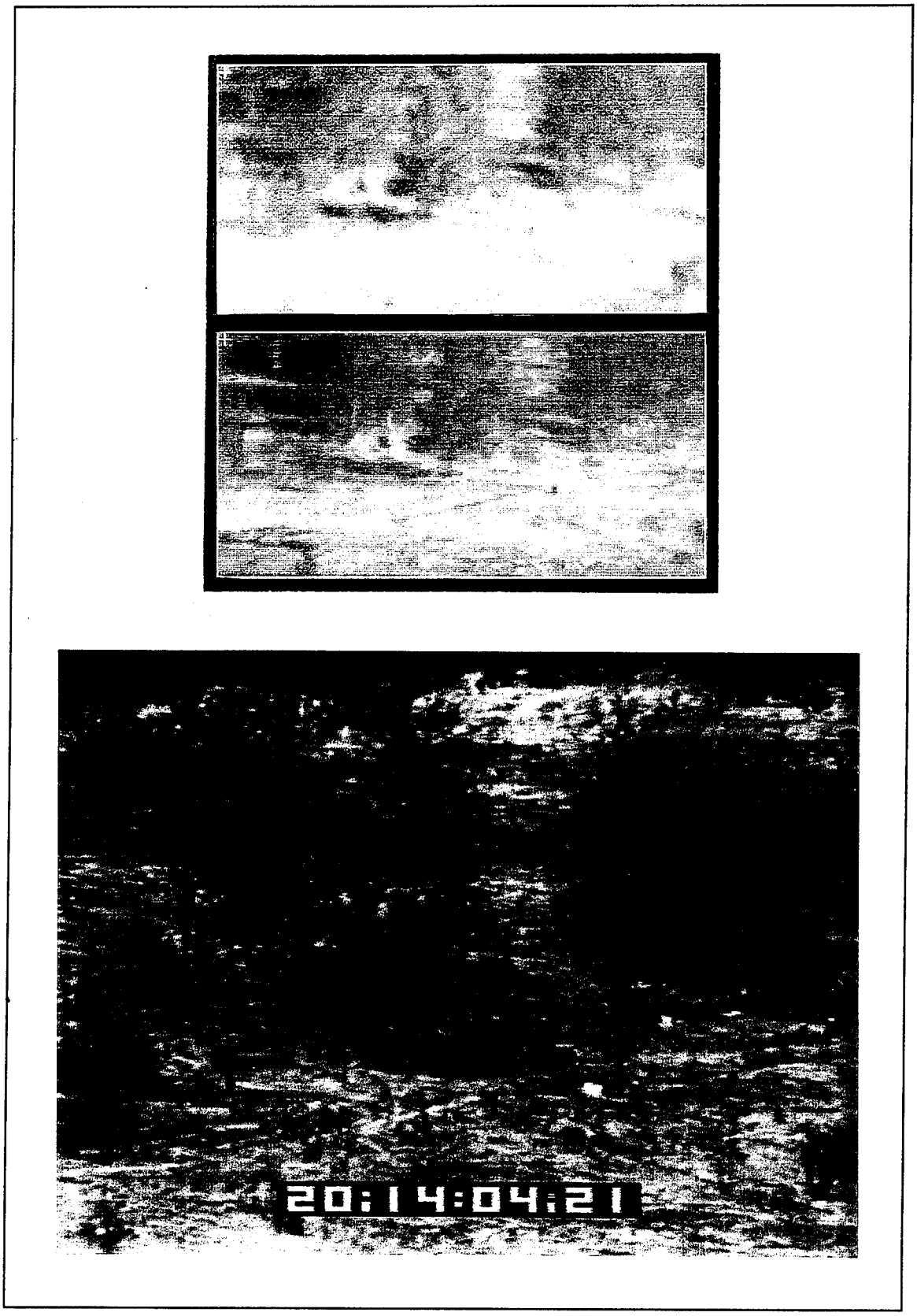
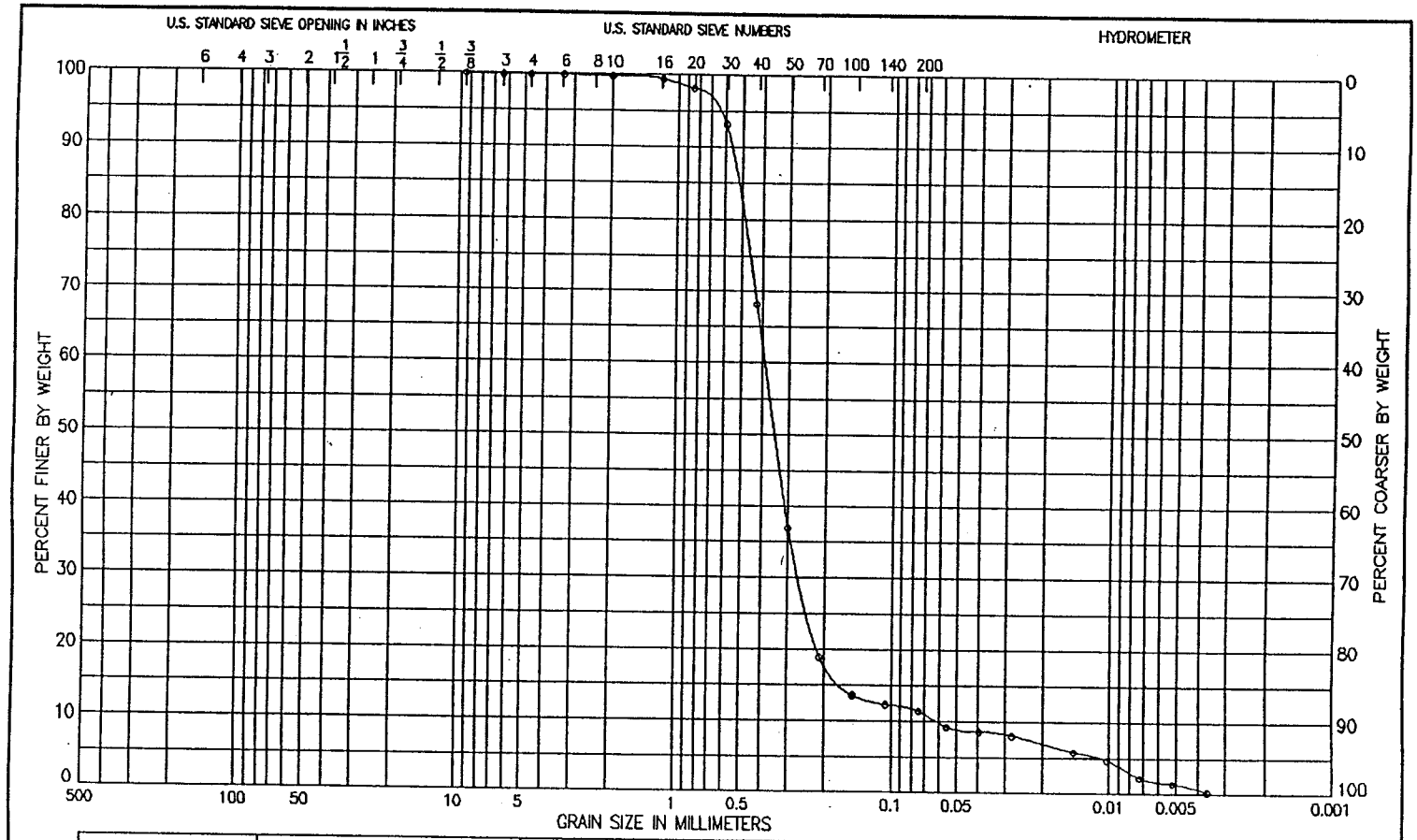


Figure 28. WES high resolution feature 12, SWIR, LWIR, and visual imagery

Appendix A
Soil Characterization Data



LL	PL	PI	GS	NAT W,%	ORG,%
NP			2.68 EST		

CLASSIFICATION
SILTY SAND (SP--SM), DARK GRAY

GRADATION CURVE | LABORATORY USAE WES – STF/GL

PROJECT SWOE CHARACTERIZATION STUDY
GRAYLING, MI
BORING NO. SITE C SAMPLE NO.
DEPTH/ELEV. DATE 28 SEP 92

SIEVE ANALYSIS

PROJECT: SWOE CHARACTERIZATION STUDY
GRAYLING, MI

BORING: SITE C SAMPLE: DF: MD0193 .DAT
DEPTH: DATE: 28 SEP 92

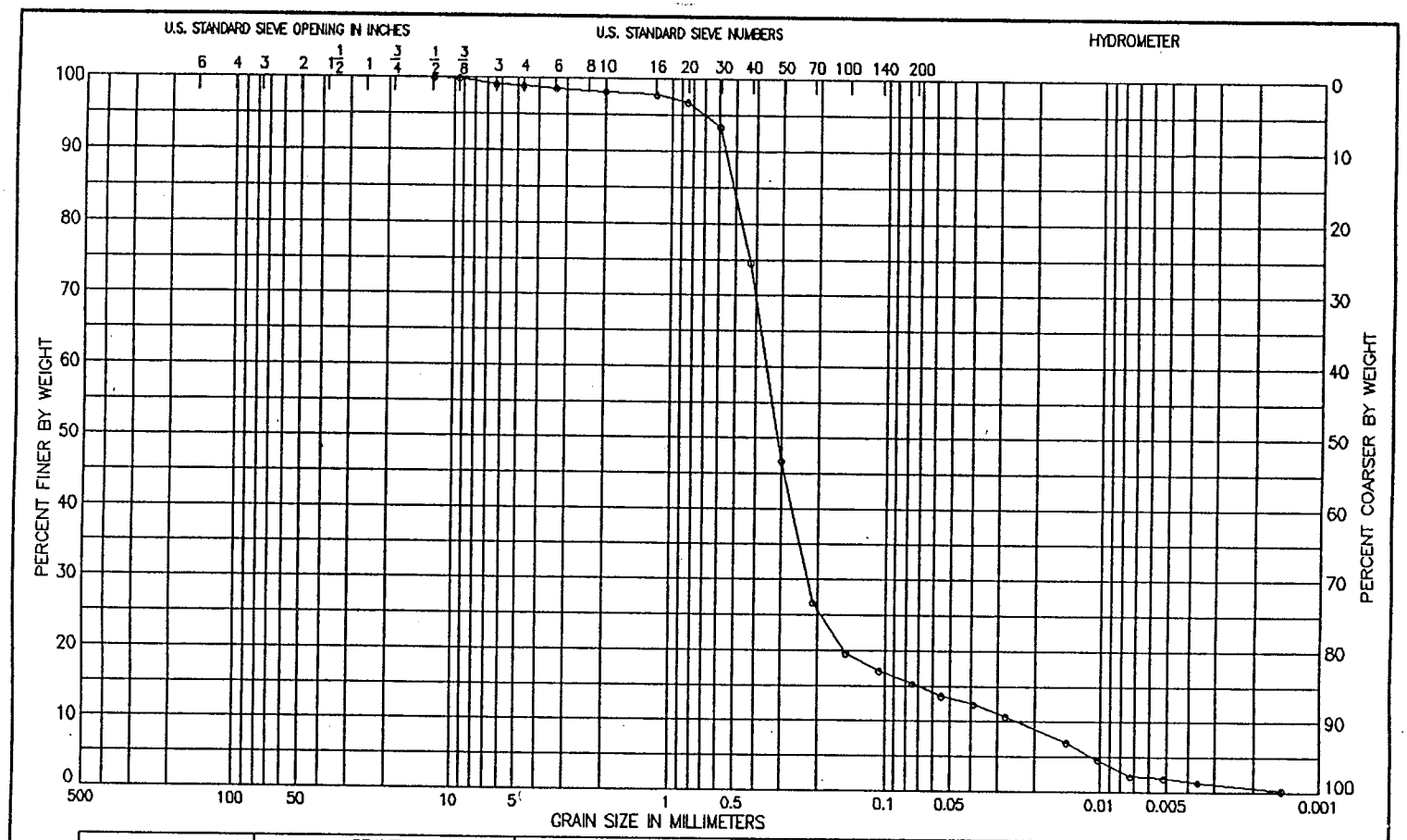
NON-PLASTIC GS: 2.68 est WC: .00
CLASSIFICATION: 108
SILTY SAND (SP-SM), DARK GRAY

TOTAL WEIGHT OF SAMPLE: 1412.0 gms.
PARTIAL WEIGHT AFTER SPLIT: 56.6 gms.

WEIGHTS gm.	SIEVE SIZE or NUMBER	OPENING mm	PERCENT FINER	PERCENT COARSER
.0	3/8 in	9.500	100.0	.0
1.0	No 3	6.350	99.9	.1
.2	No 4	4.750	99.9	.1
.2	No 6	3.350	99.9	.1
1.3	No 10	2.000	99.8	.2
.2	No 16	1.180	99.5	.5
.9	No 20	.850	98.2	1.8
3.7	No 30	.600	93.3	6.7
17.9	No 40	.425	68.2	31.8
35.6	No 50	.300	37.0	63.0
45.9	No 70	.212	18.9	81.1
48.9	No 100	.150	13.6	86.4
49.6	No 140	.106	12.3	87.7
50.1	No 200	.075	11.5	88.5
HYDROMETER:				
RDGS	TEMP			
3.5	21.5	.0557	9.3	90.7
3.3	21.5	.0395	8.7	91.3
3.1	21.5	.0279	8.2	91.8
2.3	21.5	.0145	5.9	94.1
2.0	21.0	.0103	4.8	95.2
1.0	21.5	.0073	2.3	97.7
.7	21.5	.0052	1.4	98.6
.2	22.0	.0036	.3	99.7

PERCENT GRAVEL = .1
PERCENT SAND = 88.5
PERCENT FINES = 11.5

D60 = .39
D30 = .27
D10 = .02
CU = 16.61
CC = 7.65



LL	PL	PI	GS	NAT W,%	ORG,%
34	28	6	2.69 EST		

CLASSIFICATION
SILTY SAND (SM), DARK GRAY

GRADATION CURVE | LABORATORY USAE WES – STF/GL

PROJECT SWOE CHARACTERIZATION STUDY
GRAYLING, MI
BORING NO. SITE PT 0 SAMPLE NO.
DEPTH/ELEV DATE 28 SEP 92

SIEVE ANALYSIS

PROJECT: SWOE CHARACTERIZATION STUDY
GRAYLING, MI

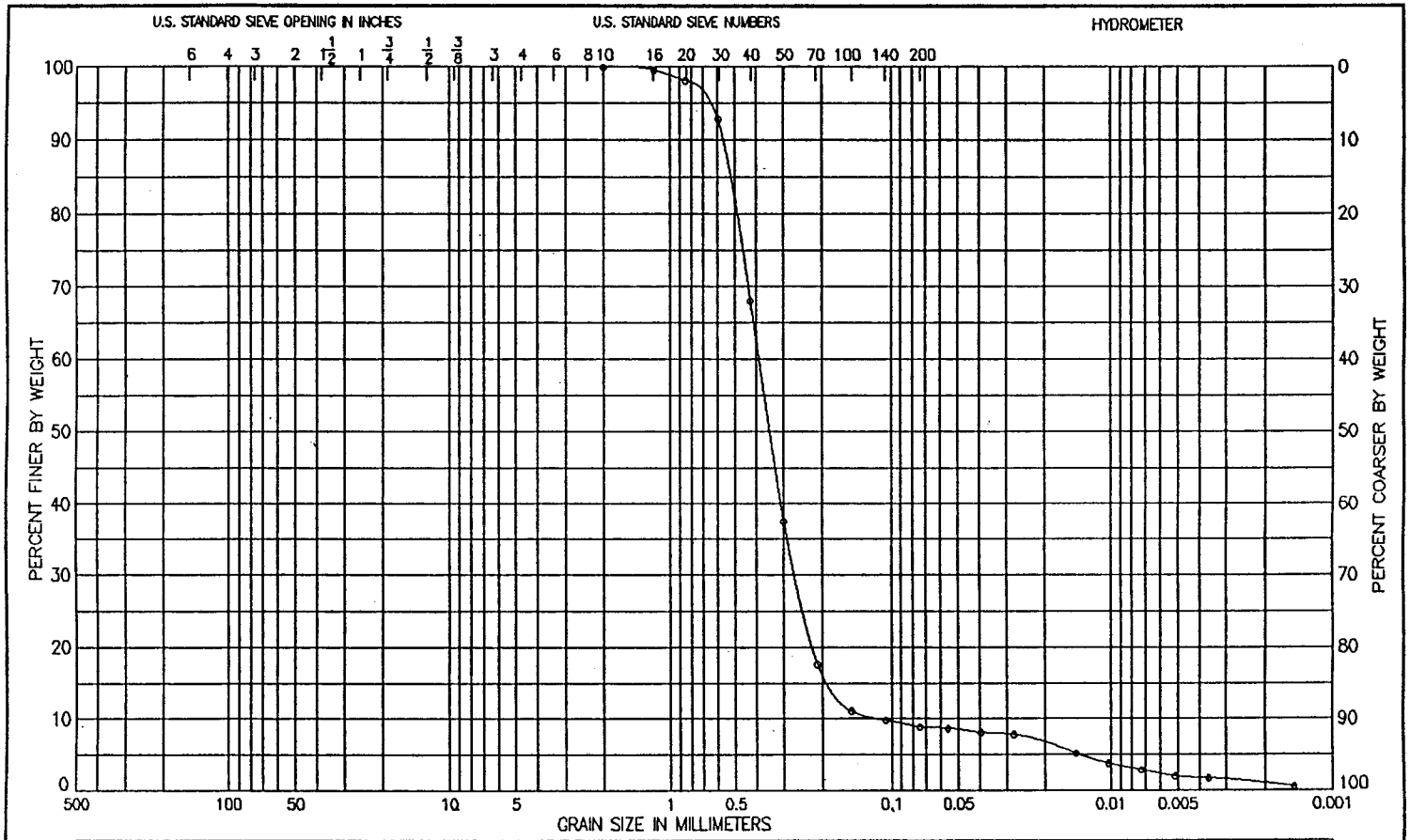
BORING: SITE F1 SAMPLE: DF: MD0193 .DAT
DEPTH: DATE: 28 SEP 92

LL: 34 PL: 28 PI: 6 GS: 2.69 est WC: .00
CLASSIFICATION: 160
SILTY SAND (SM), DARK GRAY

TOTAL WEIGHT OF SAMPLE: 1494.0 gms.
PARTIAL WEIGHT AFTER SPLIT: 55.2 gms.

WEIGHTS gm.	SIEVE SIZE or NUMBER	OPENING mm	PERCENT FINER	PERCENT COARSER
.0	1/2 in	12.500	100.0	.0
1.5	3/8 in	9.500	99.9	.1
11.3	No 3	6.350	99.1	.9
2.9	No 4	4.750	98.9	1.1
5.0	No 6	3.350	98.6	1.4
6.0	No 10	2.000	98.2	1.8
.2	No 16	1.180	97.9	2.1
.8	No 20	.850	96.8	3.2
2.7	No 30	.600	93.4	6.6
13.3	No 40	.425	74.5	25.5
29.0	No 50	.300	46.6	53.4
40.2	No 70	.212	26.7	73.3
44.2	No 100	.150	19.6	80.4
45.6	No 140	.106	17.1	82.9
46.6	No 200	.075	15.3	84.7
HYDROMETER:				
RDGS	TEMP			
5.0	21.5	.0549	13.6	86.4
4.6	21.5	.0389	12.5	87.5
4.0	21.5	.0277	10.8	89.2
2.7	21.5	.0144	7.1	92.9
1.9	21.0	.0103	4.5	95.5
1.0	21.5	.0073	2.3	97.7
.9	21.5	.0052	2.0	98.0
.6	22.0	.0036	1.4	98.6
.4	21.0	.0015	.3	99.7

PERCENT GRAVEL = 1.1
PERCENT SAND = 83.6
PERCENT FINES = 15.3



LL	PL	PI	GS	NAT W,%	ORG,%
NP			2.68 EST		

CLASSIFICATION
SILTY SAND (SP-SM), DARK GRAY

GRADATION CURVE

LABORATORY USAE WES – STF/GL

PROJECT SWOE CHARACTERIZATION STUDY
GRAYLING, MI
BORING NO. SITE E1 SAMPLE NO.
DEPTH/ELEV DATE 28 SEP 92

SIEVE ANALYSIS

PROJECT: SWOE CHARACTERIZATION STUDY
GRAYLING, MI

BORING: SITE E1 SAMPLE: DF: MD0193 .DAT
DEPTH: DATE: 28 SEP 92

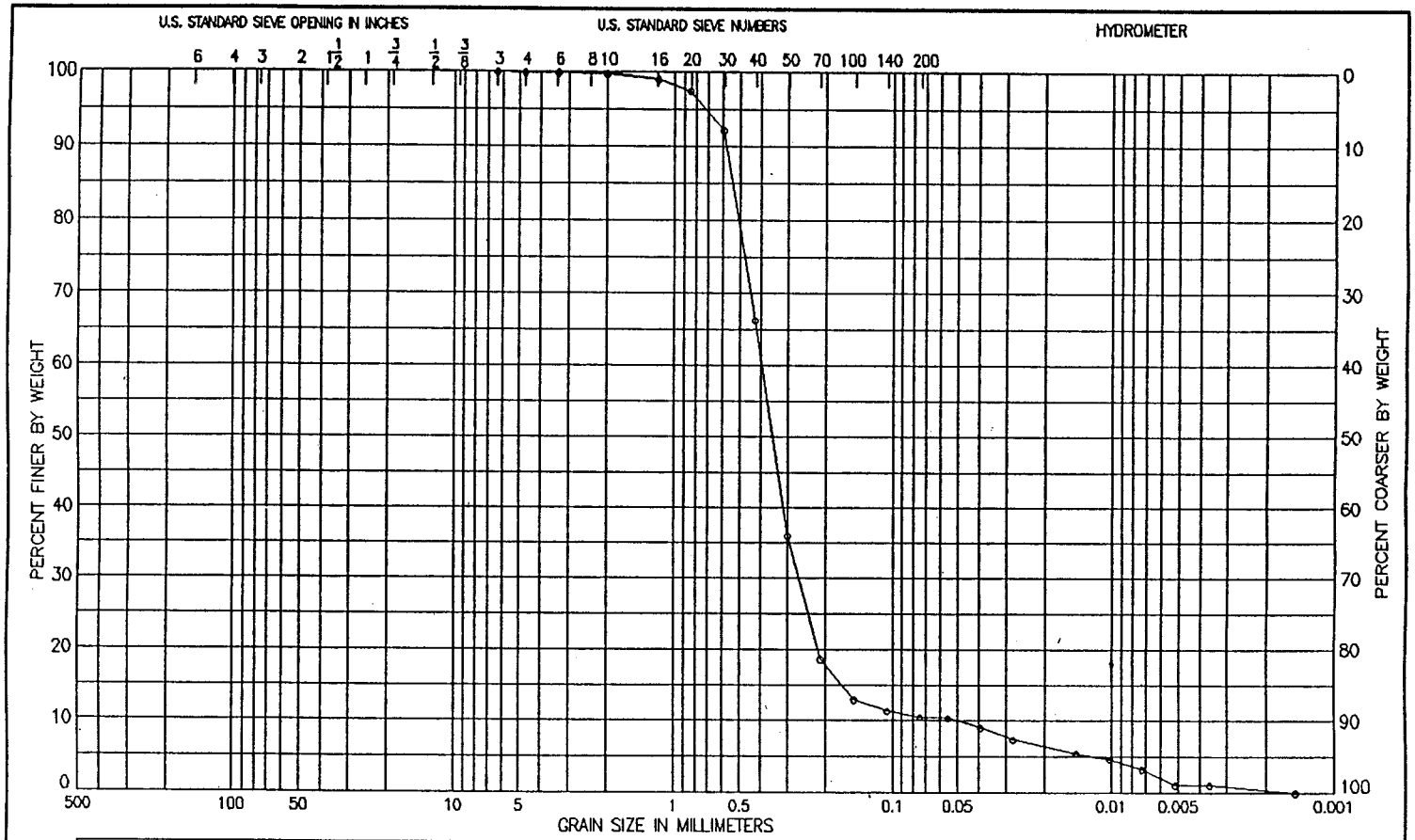
NON-PLASTIC GS: 2.68 est WC: .00
CLASSIFICATION: 126
SILTY SAND (SP-SM), DARK GRAY

TOTAL WEIGHT OF SAMPLE: .0 gms.
PARTIAL WEIGHT AFTER SPLIT: 54.9 gms.

WEIGHTS gm.	SIEVE SIZE or NUMBER	OPENING mm	PERCENT FINER	PERCENT COARSER
.0	No 10	2.000	100.0	.0
.2	No 16	1.180	99.6	.4
1.0	No 20	.850	98.2	1.8
3.9	No 30	.600	92.9	7.1
17.5	No 40	.425	68.1	31.9
34.3	No 50	.300	37.5	62.5
45.2	No 70	.212	17.7	82.3
48.8	No 100	.150	11.1	88.9
49.5	No 140	.106	9.8	90.2
50.0	No 200	.075	8.9	91.1
HYDROMETER:				
RDGS	TEMP			
3.2	21.5	.0558	8.7	91.3
3.0	21.5	.0396	8.1	91.9
2.9	21.5	.0280	7.8	92.2
2.0	21.5	.0146	5.2	94.8
1.6	21.0	.0103	3.8	96.2
1.2	21.5	.0073	2.9	97.1
.9	21.5	.0052	2.0	98.0
.7	22.0	.0036	1.7	98.3
.5	21.0	.0015	.6	99.4

PERCENT GRAVEL = .0
PERCENT SAND = 91.1
PERCENT FINES = 8.9

D60 = .39
D30 = .27
D10 = .11
CU = 3.51
CC = 1.63



LL	PL	PI	GS	NAT W,%	ORG,%
34	30	4	2.69 EST		

CLASSIFICATION
SILTY SAND (SP–SM), DARK GRAY

GRADATION CURVE | LABORATORY USAE WES – STF/GL

PROJECT SWOE CHARACTERIZATION STUDY
GRAYLING, MI
BORING NO. SITE E2 SAMPLE NO.
DEPTH/ELEV DATE 28 SEP 92

SIEVE ANALYSIS

PROJECT: SWOE CHARACTERIZATION STUDY
GRAYLING, MI

BORING: SITE E2 SAMPLE: DF: MD0193 .DAT
DEPTH: DATE: 28 SEP 92

LL: 34 PL: 30 PI: 4 GS: 2.69 est WC: .00
CLASSIFICATION: 142
SILTY SAND (SP-SM), DARK GRAY

TOTAL WEIGHT OF SAMPLE: 1435.0 gms.
PARTIAL WEIGHT AFTER SPLIT: 57.9 gms.

WEIGHTS gm.	SIEVE SIZE or NUMBER	OPENING mm	PERCENT FINER	PERCENT COARSER
.0	No 3	6.350	100.0	.0
.5	No 4	4.750	100.0	.0
.5	No 6	3.350	99.9	.1
2.1	No 10	2.000	99.8	.2
.4	No 16	1.180	99.1	.9
1.3	No 20	.850	97.5	2.5
4.4	No 30	.600	92.2	7.8
19.4	No 40	.425	66.4	33.6
37.0	No 50	.300	36.0	64.0
47.1	No 70	.212	18.6	81.4
50.4	No 100	.150	12.9	87.1
51.3	No 140	.106	11.4	88.6
51.8	No 200	.075	10.5	89.5
HYDROMETER:				
RDGS	TEMP			
4.0	21.5	.0553	10.4	89.6
3.5	21.5	.0393	9.1	90.9
2.9	21.5	.0279	7.4	92.6
2.2	21.5	.0145	5.5	94.5
2.0	21.0	.0103	4.7	95.3
1.4	21.5	.0073	3.3	96.7
.6	21.5	.0052	1.1	98.9
.5	22.0	.0036	1.1	98.9
.3	21.0	.0015	.0	100.0

PERCENT GRAVEL = .0
PERCENT SAND = 89.5
PERCENT FINES = 10.5

D60 = .40
D30 = .27
D10 = .06
CU = 7.05
CC = 3.22

Appendix B
Plant Characterization Data

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687161.32	4951789.63	352.62	OAK	200		6.4	3.4
687160.66	4951788.99	352.68	OAK	201		6	3
687172.29	4951816.34	353.21	OAK	202		2.4	1.8
687185.18	4951818.47	352.79	OAK	203		2	1.5
687190.32	4951827.73	352.67	OAK	204		3.2	2.2
687189.93	4951831.86	352.82	OAK	205		5.8	3.8
687187.17	4951839.24	353.19	OAK	206		3.7	2.8
687169.68	4951842.15	352.74	OAK	207		2.6	2
687171.78	4951824.33	353.17	OAK	208		1.5	1
687165.36	4951827.69	352.87	OAK	209		1.4	1.5
687159.00	4951839.26	352.39	OAK	210		3	1.5
687154.94	4951840.46	352.37	OAK	211		1	6.3
687161.25	4951869.48	352.66	OAK	212		6.4	4
687183.35	4951814.86	352.80	PINE	213		3.4	6.2
687195.52	4951812.55	352.14	PINE	214		4.2	5.2
687201.64	4951809.63	352.13	PINE	215		4.4	3
687196.53	4951777.65	351.87	PINE	216		5.1	3
687195.72	4951775.58	351.82	PINE	217		5.1	3

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687194.70	4951771.11	351.96	PINE	218		5.3	3
687196.24	4951772.83	351.81	PINE	219		5.1	3
687196.57	4951770.78	351.71	PINE	220		5.1	3.5
687192.50	4951765.49	352.03	PINE	221		5.4	3.5
687160.14	4951821.18	352.73	PINE	222		4.6	4
687158.65	4951822.26	352.65	PINE	223		4.9	4.5
687206.49	4951836.20	352.48	PINE	224	13	2.5	2.5
687209.00	4951819.37	351.81	PINE	225		2	2.4
687211.31	4951862.05	352.89	PINE	226		1.7	1
687212.51	4951866.83	352.97	PINE	227	17	5.4	4.3
687208.72	4951883.14	352.51	PINE	228	22	5.4	3.8
687210.47	4951892.17	352.30	PINE	229		3.3	2.2
687209.46	4951895.13	352.22	PINE	230		3	1.4
687213.81	4951893.63	352.34	PINE	231	24	5.2	4.6
687212.04	4951896.15	352.25	PINE	232	23	5.5	5.2
687212.31	4951898.54	352.11	PINE	233		4.2	4.1
687213.05	4951897.81	352.22	PINE	234		4.7	4.2
687222.98	4951902.79	352.00	PINE	235	28	6.2	5.1

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687224.54	4951902.75	351.90	PINE	236		6	6
687231.04	4951913.68	351.81	PINE	237	29	4.7	5
687268.80	4951914.87	351.88	PINE	238	6	3	4.3
687211.81	4951941.33	352.45	PINE	239	33	5.7	4
687211.38	4951942.22	352.44	PINE	240		5	6.7
687220.49	4951943.92	352.58	PINE	241	32	6.2	11.3
687222.47	4951963.44	353.33	PINE	242			
687221.93	4951971.64	353.35	PINE	243	45		
687221.49	4951973.59	353.21	PINE	244			
687224.28	4951979.07	353.17	PINE	245	46		
687225.11	4951979.85	353.24	PINE	246			
687196.42	4951986.22	352.85	PINE	247		5.2	4.1
687196.43	4952003.99	353.04	PINE	248		4	4.8
687195.19	4952002.88	352.99	PINE	249		1.9	1.4
687236.53	4952021.21	353.56	PINE	250	65	4.2	5.1
687271.15	4952026.79	352.03	PINE	251		5.7	6.9
687268.77	4952030.39	351.86	PINE	252		5.2	4.5
687280.30	4952017.90	352.29	OAK	253	57	2.7	3.5

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687247.33	4952043.89	352.85	OAK	254		3.1	3
687245.15	4952043.56	353.00	OAK	255		3.7	4.6
687241.01	4952026.71	353.39	OAK	256		7.5	7.4
687239.62	4952019.72	353.50	OAK	257		4.7	2
687251.63	4952012.20	352.98	OAK	258		1.5	1.4
687249.79	4952006.51	353.26	OAK	259	59	2	1.3
687245.25	4951992.75	353.41	OAK	261		7.5	8
687244.15	4951979.77	353.09	OAK	262		8	6.7
687211.24	4951973.89	352.82	OAK	263			
687200.33	4951980.09	352.64	OAK	264		1.4	1.5
687197.48	4951979.58	352.61	OAK	265		1.6	1.3
687197.06	4951982.84	352.74	OAK	266		7.8	6.2
687198.77	4951983.88	352.74	OAK	267		7	4.2
687194.24	4951978.43	352.76	OAK	268		1.8	1.2
687190.52	4951974.11	352.90	OAK	269		1.5	1.6
687189.37	4951970.69	352.98	OAK	270		1.3	1.4
687256.77	4951891.20	351.98	OAK	271	7	2.9	2.7
687254.65	4951914.78	351.85	OAK	272		1.3	0.9

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687243.38	4951927.07	351.85	OAK	273	53	2.6	2.3
687225.16	4951916.54	352.14	OAK	274	0	1.2	0.9
687214.12	4951927.71	352.23	OAK	275		2.1	1.4
687214.01	4951928.28	352.24	OAK	276		1.5	1.5
687230.41	4951932.92	352.75	OAK	277	31	9.5	9.3
687226.95	4951935.16	352.58	OAK	278		2.3	1.1
687226.80	4951935.72	352.65	OAK	279		2.4	1.5
687227.06	4951935.61	352.64	OAK	280		2.6	1.9
687213.44	4951945.01	352.60	OAK	281		2.9	3.2
687217.04	4951959.17	353.11	OAK	282			
687217.68	4951959.00	353.07	OAK	283			
687210.24	4951960.26	352.70	OAK	284			
687190.19	4951968.96	352.88	OAK	285		2.3	1.6
687188.39	4951966.72	353.00	OAK	286	40	2.5	2.3
687189.46	4951962.15	352.93	OAK	287	39	3.9	2.9
687179.66	4951949.77	353.34	OAK	288		1.9	2.3
687182.04	4951950.02	353.25	OAK	289		7	5.2
687184.58	4951948.77	353.05	OAK	290		7	6

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687178.52	4951944.65	353.18	OAK	291		2.7	2.4
687182.53	4951942.77	353.00	OAK	292		2.1	2.7
687191.75	4951933.14	352.47	OAK	293		1.4	1.2
687196.79	4951921.62	352.30	OAK	294		2.4	1.6
687196.50	4951919.77	352.33	OAK	295	34	5.1	3.2
687185.84	4951909.29	352.33	OAK	296		1.7	1.7
687179.43	4951892.30	352.33	OAK	297	21	1.6	1.6
687197.65	4951883.49	352.39	OAK	298	20	7.5	6.4
687201.11	4951884.07	352.37	OAK	299		1.5	1.5
687226.77	4951877.47	352.17	OAK	300	27	5.6	4.5
687261.37	4951856.65	351.55	OAK	301		3.2	3.1
687228.05	4951826.84	351.75	OAK	302		1.7	1.9
687213.68	4951857.93	352.79	OAK	303		1.2	1.2
687209.83	4951861.41	352.88	OAK	304		2.4	1.3
687210.78	4951864.38	352.86	OAK	305	16	2.2	2.2
687201.53	4951861.22	352.90	OAK	306		0.9	0.8
687211.89	4951855.19	352.72	PINE	307	14	0.8	1.2
687207.45	4951869.18	352.75	PINE	308		1.2	1.7

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687180.07	4951914.05	352.48	PINE	309	35	4.4	5.6
687198.04	4951923.14	352.35	PINE	310		3.7	5
687291.51	4951936.64	351.99	PINE	311	5	2.6	2.9
687296.80	4951950.28	352.07	OAK	312		1.2	1.2
687294.92	4951974.39	351.94	PINE	313	2	4.1	5.6
687309.18	4952027.30	352.30	OAK	314		1.2	0.8
687311.07	4952035.66	352.39	OAK	315		2.5	2.7
687309.16	4952036.06	352.24	OAK	316		2.1	1.9
687294.56	4952034.57	351.96	OAK	317		1.5	1.3
687231.33	4952007.93	353.28	OAK	318		1	1
687345.46	4951957.35	351.79	OAK	319		2.5	1.9
687346.33	4951956.04	351.63	PINE	320		4.7	2.4
687345.18	4951948.71	351.70	PINE	321		7.6	5.7
687344.50	4951946.12	351.71	PINE	322		8.3	6.1
687344.25	4951954.19	351.71	OAK	323		0.8	0.7
687342.07	4951943.44	351.66	PINE	324		2.1	1
687343.60	4951939.94	351.47	PINE	325		2.7	1.7
687346.27	4951937.08	351.51	PINE	326		7.6	6.7

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687350.51	4951941.77	351.69	PINE	327		7.2	6
687347.79	4951936.68	351.57	PINE	328		7.6	6.4
687356.16	4951950.35	351.78	PINE	329		8	5.3
687358.53	4951949.61	352.03	PINE	330		10.5	6.6
687360.00	4951962.47	351.86	PINE	331		5.3	3.1
687360.36	4951960.87	351.95	PINE	332		8.1	6.4
687361.15	4951960.50	351.94	PINE	333		11.1	6.2
687361.66	4951959.74	351.99	PINE	334		7.4	3.2
687362.57	4951960.10	352.05	PINE	335		10.2	2.8
687363.64	4951960.73	352.10	PINE	336		10.3	5.5
687363.33	4951959.15	352.07	PINE	337		4.4	1.3
687363.45	4951958.39	352.10	PINE	338		6.2	2
687362.22	4951957.85	352.05	PINE	339		9.2	3.9
687366.46	4951963.44	352.12	PINE	340		9.5	6.4
687363.91	4951970.06	352.03	PINE	341		9	7.5
687358.05	4951974.05	351.70	PINE	342		2.9	1.7
687362.56	4951970.38	351.75	OAK	343		1.5	1.4
687363.47	4951975.88	351.79	OAK	344		1.4	1.9

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687370.41	4951977.10	352.39	OAK	345		2.6	1.7
687376.24	4951976.07	352.94	OAK	346		1.8	1.4
687376.44	4951974.29	352.93	PINE	347		7.2	4.4
687373.20	4951964.92	352.61	PINE	348		9.8	4.3
687377.60	4951967.81	353.10	PINE	349		12.5	6.3
687389.05	4951983.72	354.78	PINE	350		12	6.1
687394.55	4951981.99	355.50	PINE	351		10.1	4.3
687393.47	4951978.83	355.18	PINE	352		10.5	3.7
687396.11	4951978.99	355.55	PINE	353			
687390.74	4951980.77	354.74	PINE	354		2.1	1
687384.83	4951990.92	353.92	PINE	355			
687382.84	4951991.58	353.62	PINE	356			
687376.77	4951999.51	352.55	PINE	357		9.7	6.5
687369.72	4951997.04	351.96	PINE	358		11.8	7.1
687362.85	4951994.41	351.64	PINE	359		5.1	3.9
687363.43	4951995.97	351.65	OAK	360		3.6	3
687363.41	4951988.19	351.74	OAK	361		1.7	1.2
687368.72	4951992.41	351.89	OAK	362		1.4	0.9

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687366.85	4951993.15	351.76	OAK	363		1.6	1.1
687385.73	4951997.79	353.72	OAK	364			
687388.96	4951995.94	354.63	PINE	365		6.6	4.2
687389.37	4952007.13	353.71	PINE	366		10.1	6.5
687388.96	4952019.86	352.09	PINE	367		6.8	3.4
687390.23	4952018.33	352.05	PINE	368		4.1	3.1
687392.82	4952017.66	351.94	PINE	369		5.7	2.6
687389.48	4952015.30	352.00	PINE	370		4.6	2.2
687389.85	4952013.91	352.09	PINE	371		6.2	3.9
687390.39	4952021.81	352.24	PINE	372		6	2.7
687392.33	4952024.58	352.33	PINE	373		5.8	3.3
687393.01	4952025.26	352.24	PINE	374		6.3	3.5
687343.64	4951930.02	351.52	PINE	375		9.7	3
687343.53	4951928.25	351.50	PINE	376		10.3	5.9
687347.45	4951930.35	351.56	PINE	377		4.5	3
687348.09	4951929.13	351.52	PINE	378		11	5.6
687353.65	4951927.86	351.66	PINE	379		17	7.9
687361.01	4951929.64	351.76	PINE	380		17	7.9

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687369.41	4951930.98	352.54	PINE	381			
687367.53	4951928.23	352.29	PINE	382		8	2.8
687344.52	4951908.51	351.50	PINE	383		10	4.2
687358.41	4951902.58	351.94	PINE	384		9.5	4.7
687299.70	4951739.44	352.56	PINE	384		8.8	4.7
687300.90	4951733.30	352.79	PINE	385		9.1	4.1
687301.21	4951730.47	352.96	PINE	386		8.4	5.1
687308.22	4951727.16	353.84	PINE	387		9.5	6.5
687315.42	4951703.23	355.06	OAK	388		4.2	2.7
687325.66	4951698.73	356.00	PINE	389		2.8	2.9
687330.34	4951681.26	355.93	PINE	390		2.2	1.8
687336.90	4951676.33	356.24	PINE	391		7.1	4.5
687342.80	4951674.14	356.52	PINE	392		7.5	5.5
687343.41	4951682.62	356.97	OAK	393		13	7.5
687341.88	4951695.96	357.27	OAK	394		1.4	0.9
687343.44	4951697.15	357.41	OAK	395		2.9	2.5
687343.88	4951698.33	357.50	PINE	396		2.5	2.4
687354.30	4951700.02	357.93	PINE	397		10.5	4.1

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687341.56	4951712.45	358.09	OAK	398		2.1	1.9
687340.68	4951713.33	358.11	OAK	399		1.2	1.1
687343.72	4951714.55	358.48	OAK	400		1	0.9
687336.62	4951717.40	357.91	OAK	401		5.8	2.8
687333.20	4951718.32	357.45	OAK	402		0.9	0.8
687326.22	4951714.14	356.42	OAK	403		2	1.5
687333.55	4951723.68	357.84	OAK	404			
687329.80	4951723.22	357.06	OAK	405		1	0.7
687326.61	4951730.74	356.63	OAK	406			
687326.81	4951735.69	356.56	PINE	407			
687316.95	4951752.96	354.37	PINE	408			
687313.10	4951759.63	353.24	OAK	409			
687320.98	4951753.03	354.94	OAK	410			
687340.39	4951737.22	358.61	OAK	411			
687353.38	4951721.90	359.45	OAK	412			
687354.60	4951727.87	359.69	PINE	413			
687350.54	4951741.03	359.11	PINE	414			
687358.82	4951738.92	359.23	PINE	415			

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687366.80	4951729.56	359.24	PINE	416		12.5	6
687373.79	4951729.41	359.16	PINE	417		11.5	3.6
687374.59	4951728.17	358.98	PINE	418		11.5	3.7
687375.68	4951726.53	358.90	PINE	419		12.5	4.1
687376.35	4951729.63	359.12	PINE	420			
687375.79	4951731.26	359.23	PINE	421			
687378.76	4951732.99	359.37	PINE	422			
687376.32	4951739.27	359.23	PINE	423			
687374.24	4951741.51	358.94	PINE	424		10.1	7.3
687379.49	4951739.51	359.40	PINE	425			
687379.13	4951740.12	359.31	PINE	426			
687373.88	4951747.41	358.53	PINE	427		2.6	2
687362.04	4951749.19	358.03	OAK	428		2.1	1.6
687381.20	4951744.82	359.02	OAK	429		1.2	1.4
687385.70	4951743.72	359.18	OAK	430		1.9	1.5
687388.45	4951746.74	358.99	OAK	431		13	8.1
687384.44	4951748.22	358.83	PINE	432			
687387.68	4951751.42	358.34	PINE	433			

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687383.12	4951753.61	358.23	PINE	434			
687388.36	4951754.49	357.98	PINE	435			
687392.29	4951751.98	358.09	PINE	436			
687389.48	4951757.48	357.56	PINE	437			
687388.30	4951759.60	357.38	PINE	438			
687400.52	4951756.92	357.31	PINE	439		12	5.1
687400.56	4951760.95	357.03	PINE	440		12.5	3.5
687390.93	4951766.34	356.66	PINE	441			
687378.58	4951762.79	357.12	PINE	442		11.2	4.6
687391.71	4951770.77	356.36	PINE	443			
687395.89	4951795.04	355.94	PINE	444			
687386.26	4951803.66	355.61	PINE	445			
687383.89	4951808.89	355.94	PINE	446			
687381.85	4951811.73	356.22	PINE	447			
687372.79	4951804.32	355.18	PINE	448		10.9	3.5
687368.23	4951803.73	355.07	PINE	449		12.2	5.9
687365.78	4951807.06	355.33	OAK	450		2.2	1.7
687366.77	4951806.11	355.21	OAK	451		1.5	1.1

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687365.62	4951810.34	355.73	OAK	452		1.6	1.4
687368.85	4951811.19	355.93	OAK	453		2.3	1.6
687349.31	4951820.93	355.22	OAK	454		2.4	2.8
687329.22	4951818.68	352.41	OAK	455			
687322.59	4951819.13	351.80	PINE	456			
687321.89	4951818.48	351.86	PINE	457			
687311.43	4951829.72	351.43	PINE	458		8.4	5.2
687311.36	4951831.53	351.39	PINE	459		7.4	5.9
687301.19	4951835.90	351.44	PINE	460		144.5	5.4
687301.39	4951837.79	351.44	PINE	461		11.8	5.8
687301.53	4951838.14	351.51	PINE	462		11.8	5.8
687303.50	4951838.05	351.30	PINE	463		3.7	1.1
687303.64	4951838.30	351.31	PINE	464		3.7	1.2
687305.18	4951837.97	351.44	PINE	465		4.1	3.4
687293.06	4951833.75	351.48	PINE	466		7.8	3.2
687292.04	4951835.26	351.50	PINE	467		7.8	4.2
687292.17	4951834.71	351.53	PINE	468		7	4.3
687289.97	4951831.04	351.50	PINE	469		7.3	6.1

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687287.59	4951826.29	351.59	PINE	470		6	4.9
687303.83	4951847.72	351.49	PINE	471			
687304.53	4951853.16	351.57	PINE	472			
687303.85	4951853.59	351.61	PINE	473			
687298.39	4951857.68	351.92	PINE	474		6	4.9
687306.77	4951858.77	351.60	PINE	475			
687317.03	4951895.77	351.74	PINE	476			
687326.84	4951878.42	351.60	PINE	477		8.5	4.8
687325.37	4951876.72	351.53	PINE	478		8.5	6.1
687327.86	4951844.49	351.46	PINE	479		10.8	4.3
687323.33	4951840.17	351.44	PINE	480		4.8	2.9
687345.66	4951850.25	352.34	PINE	481		3.9	3
687350.85	4951843.39	353.62	OAK	482		1.8	3.3
687356.69	4951845.28	354.30	OAK	483		1.9	1.6
687351.49	4951840.10	354.22	OAK	484		1.8	1.9
687350.61	4951835.79	354.57	OAK	485		1.7	1.9
687354.11	4951829.83	355.72	OAK	486		1.8	1.9
687348.12	4951827.27	354.84	OAK	487		1.1	1.4

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687353.57	4951822.09	355.87	PINE	488		2.3	2.1
687366.08	4951842.87	355.77	PINE	489		10.6	2.9
687364.71	4951839.51	356.16	OAK	490		1.8	2
687379.02	4951832.20	357.91	OAK	491		1.5	0.8
687389.04	4951826.64	358.15	OAK	492		10.1	6.9
687384.35	4951824.84	357.94	OAK	493		2.1	1.6
687385.64	4951824.68	357.87	OAK	494		2.7	1.8
687383.63	4951820.77	357.51	OAK	495		1.6	1.6
687388.90	4951818.55	357.15	PINE	496			
687387.30	4951822.66	357.59	PINE	497		2.7	1.7
687390.48	4951824.34	357.77	PINE	498		1.7	1.5
687396.34	4951822.24	357.63	PINE	499		10.5	3.9
687398.53	4951821.46	357.65	PINE	500			
687381.61	4951835.90	357.88	PINE	501			
687386.58	4951838.68	358.07	PINE	502		15	3.3
687398.02	4951840.74	358.91	PINE	503		8.8	4.3
687398.56	4951843.23	358.81	PINE	504		3.5	2.2
687390.50	4951850.79	357.77	PINE	505		12	6.5

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687394.70	4951850.38	358.07	OAK	506		9	5.5
687394.11	4951851.18	357.98	OAK	507		10	5.8
687392.73	4951854.18	357.51	PINE	508		3.5	1.9
687392.87	4951854.72	357.47	PINE	509		2	1.2
687393.77	4951855.15	357.48	PINE	510		2.2	1.7
687393.71	4951856.01	357.32	PINE	511		1.8	1.2
687386.47	4951856.63	357.03	PINE	512		1.8	1.4
687384.88	4951861.03	356.35	PINE	513		14.5	3
687383.64	4951862.06	356.07	OAK	514			
687379.62	4951864.96	355.43	OAK	515		2.4	1.4
687379.11	4951865.03	355.37	OAK	516		2.2	1.7
687378.18	4951871.25	354.57	OAK	517			
687375.73	4951868.57	354.67	OAK	518			
687376.15	4951869.66	354.55	PINE	519			
687380.55	4951869.13	355.04	PINE	520		1.2	0.9
687382.12	4951868.27	355.30	PINE	521		10.1	2.9
687382.29	4951866.07	355.50	PINE	522		2.4	1.1
687382.12	4951865.26	355.63	PINE	523		3.6	2.2

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687379.58	4951863.75	355.54	PINE	524		2.3	1.7
687377.79	4951865.67	355.20	PINE	525		2.7	2
687375.97	4951867.30	355.04	PINE	526			
687368.52	4951870.23	353.88	PINE	527		2.8	1.9
687367.92	4951868.18	353.83	PINE	528		2.5	1.7
687365.12	4951868.27	353.54	PINE	529		1	0.8
687359.10	4951872.72	352.53	PINE	530		2.1	1.6
687358.07	4951875.59	352.53	PINE	531		11	7.1
687363.37	4951873.98	352.89	PINE	532		2	1.2
687368.47	4951870.35	353.86	PINE	533			
687378.13	4951873.36	354.50	PINE	534			
687382.15	4951872.24	354.83	PINE	535		2	2.4
687394.32	4951870.40	355.48	PINE	536			
687397.10	4951866.08	356.16	PINE	537			
687394.51	4951862.95	356.42	PINE	538			
687393.59	4951860.81	356.60	PINE	539			
687391.41	4951876.50	355.10	PINE	540			
687379.49	4951883.71	354.09	PINE	541			

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687381.36	4951885.42	354.28	PINE	542			
687370.62	4951885.15	353.31	PINE	543		12.5	3.4
687365.04	4951881.51	352.84	PINE	544		3.1	2.1
687363.80	4951878.70	352.82	PINE	545		1.8	1.2
687361.13	4951879.31	352.55	PINE	546		2.3	1.4
687365.11	4951876.48	353.09	OAK	547		1.9	1.6
687364.31	4951878.79	352.87	OAK	548		2.9	2
687366.06	4951874.48	353.39	PINE	549		10.2	3.7
687362.80	4951868.36	353.31	OAK	550		1.2	1
687362.08	4951861.50	353.69	OAK	551		1.9	1.7
687370.68	4951856.02	355.40	OAK	552		2.3	1.9
687372.80	4951877.42	353.73	PINE	553		2.3	1.3
687352.35	4951883.55	352.14	PINE	554		12.5	5.7
687354.45	4951890.45	352.03	PINE	555		4.3	1.5
687353.72	4951891.47	351.96	PINE	556		7.1	4.8
687355.20	4951892.91	352.03	PINE	557		7.5	3.1
687347.15	4951898.58	351.83	PINE	558		10.8	6.3
687338.69	4951900.23	351.49	PINE	559		10.5	3.4

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687337.56	4951901.33	351.46	PINE	560		11.3	6.5
687333.52	4951890.21	351.65	PINE	561		10.3	6.4
687335.02	4951888.20	351.72	PINE	562		5.1	1.8
687333.92	4951881.94	351.82	OAK	563		1.8	1.3
687320.38	4951897.44	351.76	OAK	563			
687361.03	4952052.45	352.24	OAK	565		2.1	1.5
687364.41	4952057.11	352.23	OAK	566		1.4	1.6
687369.60	4952091.04	352.41	PINE	567		2.7	3
687334.81	4952091.89	352.35	OAK	568		2.7	2.7
687332.97	4952091.42	352.38	OAK	569		1.5	1.4
687274.30	4952105.56	353.11	OAK	570		1.9	2.2
687273.36	4952101.22	353.05	OAK	571		0.7	0.9
687271.21	4952100.07	353.12	OAK	572		1	1
687260.97	4952108.75	352.96	OAK	573		1.3	2.1
687269.06	4952123.22	353.21	W. CHERRY	574		2.6	3.3
687289.20	4952142.53	352.59	OAK	575		1.3	1.6
687294.22	4952151.75	352.62	OAK	576		2.2	2.6
687308.47	4952143.14	352.36	OAK	577		0.9	0.9

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687324.46	4952149.01	352.12	OAK	578		1	0.9
687318.49	4952158.04	352.51	OAK	579		1.4	1.8
687322.25	4952160.12	352.32	W. CHERRY	580		1	0.8
687305.09	4952174.18	352.64	W. CHERRY	581		2.4	2.7
687276.75	4952156.10	352.68	OAK	582		0.9	1
687262.76	4952141.04	353.21	OAK	583		2.7	3.9
687260.21	4952149.02	353.07	OAK	584		1.2	1.4
687241.29	4952159.69	353.61	OAK	585		2.2	1.9
687240.28	4952157.21	353.58	OAK	586		2.3	1.9
687242.35	4952149.05	353.43	OAK	587		1.8	2.4
687233.84	4952145.93	353.41	OAK	588		2.2	1.6
687229.61	4952127.71	353.13	OAK	589		1.9	2.7
687241.86	4952133.26	353.35	OAK	590		1.1	1.1
687256.70	4952192.36	353.55	OAK	591		1.1	1.1
687271.63	4952191.83	353.32	OAK	592		1.1	1.2
687278.82	4952192.25	353.16	OAK	593		0.8	1.3
687281.46	4952187.00	352.91	OAK	594		1.1	1.5
687284.07	4952181.77	352.76	OAK	595		1.1	1

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687273.80	4952211.28	353.42	OAK	596		0.9	1.2
687286.61	4952211.76	353.15	OAK	597		1.1	1.4
687305.81	4952221.73	353.04	OAK	598		1.3	1.6
687309.96	4952227.25	353.10	OAK	599		1.2	1.3
687311.37	4952229.18	353.21	OAK	600		1.1	1.1
687314.18	4952226.50	353.05	OAK	601		0.6	0.9
687313.04	4952218.50	352.93	OAK	602		1.7	2.1
687323.87	4952219.45	352.84	OAK	603		1	1.2
687315.74	4952209.07	352.86	OAK	604		0.9	1.5
687308.71	4952206.01	352.90	OAK	605		1.1	1.1
687310.42	4952200.80	352.81	OAK	606		0.9	0.9
687313.68	4952197.75	352.72	OAK	607		1.5	1.2
687312.71	4952196.92	352.74	OAK	608		1.8	1.7
687315.27	4952194.22	352.75	OAK	609		2.3	1.4
687328.09	4952187.81	352.57	OAK	610		1.6	1.4
687335.19	4952195.66	352.67	OAK	611		1.5	1.3
687339.55	4952199.43	352.60	OAK	612		0.7	0.5
687334.54	4952209.88	352.74	OAK	613		0.8	1.4

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687337.16	4952211.52	352.79	OAK	614		1.4	1.7
687337.24	4952220.22	352.79	OAK	615		1.2	1
687353.64	4952215.41	352.63	OAK	616		0.8	0.9
687356.42	4952216.16	352.48	OAK	617		0.9	1
687374.59	4952219.06	352.40	OAK	618		0.9	0.7
687396.99	4952234.14	352.48	OAK	619		1.5	1.3
687167.42	4951778.53	352.58	PINE	620		5.3	5.8
687168.97	4951777.27	352.61	PINE	621		5.3	6.1
687179.43	4951779.42	352.61	PINE	622		6.2	3.2
687178.72	4951778.89	352.60	PINE	623		6.2	2
687178.63	4951777.23	352.62	PINE	624		6.1	3
687180.43	4951776.37	352.71	PINE	625		6.1	3.2
687184.14	4951779.05	352.49	OAK	626		2.5	3
687185.72	4951784.32	352.25	PINE	627		1.2	0.7
687192.95	4951786.07	352.01	PINE	628			
687193.87	4951763.35	351.94	PINE	629			
687202.04	4951755.95	351.77	PINE	630			
687202.75	4951768.16	351.61	OAK	631		1.8	1.4

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687196.32	4951793.89	351.99	OAK	632			
687223.24	4951777.54	351.66	W. CHERRY	633		2.1	4.5
687241.03	4951839.19	351.62	OAK	634		0.8	1
687225.01	4951855.97	352.17	OAK	635		1	2
687223.20	4951860.48	352.37	OAK	636		1.5	1.6
687217.97	4951864.32	352.63	OAK	637		2.4	1.9
687215.96	4951864.45	352.74	OAK	638		1.7	2.1
687216.97	4951872.24	352.58	OAK	639		1.4	1.3
687218.82	4951872.51	352.60	W. CHERRY	640		1.1	1.6
687241.11	4951881.35	351.32	W. CHERRY	641		1.4	1
687253.39	4951886.97	351.89	W. CHERRY	642		5	4.4
687270.44	4951893.77	351.92	W. CHERRY	643			
687279.27	4951880.49	351.80	W. CHERRY	644		0.9	0.6
687274.95	4951881.47	351.84	W. CHERRY	645		1	0.7
687280.69	4951879.40	351.86	OAK	646		1.2	1.1
687229.02	4951908.30	351.65	OAK	647		1.6	0.9
687200.15	4951923.48	352.27	OAK	648		3.7	3.4
687216.88	4951892.63	352.37	PINE	649	25	5.6	5.1

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687224.09	4951892.38	352.15	PINE	650	26	5.8	7.5
687225.87	4951903.39	351.81	OAK	651		2.4	1.5
687236.16	4951938.02	352.52	OAK	652		3.1	1.7
687236.70	4951939.07	352.48	OAK	653		1.5	1.6
687247.25	4951935.83	351.89	OAK	654		1.9	1.3
687248.10	4951933.89	351.82	OAK	655		1.6	1.5
687251.82	4951943.65	351.82	PINE	656	51	6	4.5
687263.34	4951936.22	351.99	PINE	657	54	4.6	5.4
687265.34	4951940.34	351.92	OAK	658		2.6	1.9
687296.20	4951955.01	352.07	W. CHERRY	659		1.4	1.1
687288.77	4951957.58	352.15	W. CHERRY	660		1	0.9
687270.94	4951954.17	351.77	PINE	661		1.2	1.5
687258.26	4951964.34	351.57	PINE	662	50	1.8	1.6
687250.44	4951976.95	352.68	OAK	663		1.2	1.5
687251.51	4951987.84	352.78	OAK	664		2.5	2.3
687247.96	4951995.06	353.11	OAK	665		0.9	0.8
687248.63	4951983.12	352.82	W. CHERRY	666	49	1.2	1.7
687320.45	4951897.19	351.75	PINE	564			

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687365.85	4951865.71	353.87	OAK	667		3.1	2.7
687366.54	4951863.21	354.10	OAK	668		0.9	1
687368.90	4951865.76	354.17	OAK	669		4	3.4
687370.81	4951864.03	354.58	OAK	670			
687375.06	4951863.30	354.98	PINE	671		2.3	1.9
687377.31	4951862.22	355.40	PINE	672		1.8	1.9
687374.71	4951879.65	353.61	PINE	673		2.5	1.3
687357.13	4951909.93	351.75	PINE	675		14.8	3.8
687361.00	4951918.24	351.79	PINE	676		13	5.6
687360.05	4951923.53	351.70	PINE	677		13.2	6.2
687366.87	4951925.53	352.15	PINE	679		13.5	5.5
687369.66	4951924.89	352.45	PINE	680		12.5	4.9
687369.53	4951926.39	352.45	PINE	681			
687372.38	4951924.01	352.80	PINE	682		12.6	5.9
687327.50	4952001.66	351.96	OAK	683		0.9	1.3
687314.10	4952012.99	352.18	OAK	684	1	7.5	6.8
687290.96	4952035.87	352.05	OAK	685A		1.2	1.2
687283.31	4952035.16	352.06	PINE	685B		7.8	2.8

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687279.24	4952004.93	351.81	PINE	686	56	5.6	6.9
687275.01	4951998.65	351.46	PINE	687	55	4.5	6.9
687405.53	4952070.20	352.21	PINE	688			
687408.69	4952061.62	352.40	PINE	689			
687409.11	4952059.81	352.37	PINE	690		5.6	3.7
687406.86	4952061.06	352.32	PINE	691		9.6	8.2
687428.89	4952054.31	354.07	PINE	692		8.5	4.9
687430.62	4952052.67	354.37	PINE	693		6.1	3.5
687433.21	4952049.82	354.80	PINE	693			
687431.78	4952056.63	354.37	PINE	694		7.7	5.4
687433.10	4952058.66	354.43	PINE	696		7.4	3.7
687431.95	4952059.49	354.24	OAK	697		1.7	1.3
687427.94	4952060.50	353.61	OAK	698		1.5	1.7
687426.91	4952059.92	353.50	OAK	699		0.9	0.6
687426.28	4952059.70	353.48	OAK	700		0.8	0.7
687427.10	4952070.44	352.78	OAK	701		2.2	2.7
687412.09	4952070.96	352.03	OAK	702		2.6	1.7
687404.50	4952064.31	352.12	OAK	703		1.1	0.8

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687402.33	4952067.01	351.98	OAK	704		1.2	1
687401.85	4952062.93	352.14	OAK	705		1	1.2
687400.43	4952062.54	352.01	OAK	706		0.7	0.6
687402.66	4952066.37	351.98	PINE	707		1.8	1.1
687378.70	4952453.91	358.58	OAK	708		1.2	1.1
687385.50	4952460.73	359.23	OAK	709		7.5	5.4
687386.18	4952463.06	359.26	OAK	710		7.7	5.6
687383.15	4952464.18	359.72	OAK	711		1.7	1.3
687382.78	4952469.16	360.33	OAK	712		0.7	0.6
687380.76	4952471.42	360.97	OAK	713		9.5	7.2
687377.08	4952469.72	361.08	OAK	714		7.3	3.2
687376.11	4952469.80	361.31	OAK	715		7.6	3.3
687375.27	4952467.50	360.89	OAK	716		0.7	0.7
687373.80	4952465.17	360.79	OAK	717		0.9	0.6
687374.02	4952464.84	360.69	OAK	718		0.9	0.8
687370.76	4952470.08	361.72	OAK	719		1.7	1.6
687371.06	4952471.23	361.85	OAK	720		4.8	3.7
687371.65	4952473.59	362.11	OAK	721		6.8	4.6

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687370.91	4952476.76	362.54	OAK	722		1.3	1.1
687367.06	4952475.61	363.01	OAK	723		4.2	3.4
687367.03	4952474.94	363.00	OAK	724		8.9	5.8
687363.83	4952471.26	362.86	OAK	725		6.3	4.3
687362.30	4952467.34	362.77	OAK	726		1.5	1
687358.47	4952464.59	362.65	OAK	727		6.8	5.6
687360.20	4952461.97	361.97	OAK	728		1.2	0.9
687360.38	4952458.81	361.40	OAK	729		1.3	0.9
687364.02	4952456.23	360.59	OAK	730		2	1.1
687365.38	4952455.78	360.19	OAK	731		1	0.8
687364.39	4952455.57	360.32	OAK	732		1.9	1.5
687365.06	4952449.43	359.39	OAK	733		7.5	3.3
687357.81	4952451.89	360.74	OAK	734		7.5	6.2
687359.17	4952453.48	360.68	OAK	735		5.4	5.2
687359.45	4952455.04	360.97	OAK	736		7.5	4.4
687361.03	4952454.43	360.54	OAK	737		1.1	0.8
687355.32	4952455.15	361.20	OAK	738		2.9	1.5
687353.62	4952457.24	361.82	OAK	739		1.5	1

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687353.38	4952458.73	361.98	OAK	740		2.3	1.5
687353.31	4952458.99	362.05	OAK	741		1.9	1
687353.70	4952459.51	362.17	OAK	742		1.5	0.8
687352.10	4952458.88	362.07	OAK	743		1.4	0.8
687351.87	4952461.41	362.47	OAK	744		1.8	0.8
687351.00	4952464.37	363.08	OAK	745		0.8	1.2
687349.52	4952467.17	363.57	OAK	746		0.9	0.5
687344.70	4952469.31	364.17	OAK	747		1.7	0.8
687344.63	4952470.49	364.41	OAK	748		1.3	1
687343.79	4952468.68	364.20	OAK	749		2.4	1
687343.44	4952469.58	364.35	OAK	750		2.2	1.1
687346.68	4952482.41	365.75	OAK	751		2.3	1.6
687349.62	4952475.93	365.01	OAK	752		2.3	1.3
687340.00	4952469.68	364.64	OAK	753		2.7	2.4
687340.05	4952467.95	364.28	OAK	754		2.5	1.2
687340.96	4952467.19	364.11	OAK	755		2.5	1
687343.25	4952465.88	363.83	OAK	756		3.5	2.5
687346.35	4952463.33	363.08	OAK	757		1.9	0.8

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687347.12	4952462.49	362.97	OAK	758		1.9	1.3
687344.14	4952463.41	363.37	OAK	759		2	0.9
687343.22	4952463.31	363.43	OAK	760		3.4	2.1
687341.54	4952461.09	363.20	OAK	761		2.8	2.7
687338.65	4952460.76	363.39	OAK	762		3	1.9
687338.75	4952457.74	362.96	OAK	763		1.7	1.1
687339.73	4952458.41	362.97	OAK	764		1	0.9
687340.13	4952456.60	362.64	OAK	765		1.6	1.1
687337.66	4952461.47	363.52	OAK	766		2.6	1.2
687337.19	4952461.76	363.61	OAK	767		2.4	1
687336.41	4952461.49	363.75	OAK	768		1.7	0.9
687336.00	4952462.97	363.92	OAK	769		4.3	2.4
687334.80	4952463.42	364.17	OAK	770		1.8	1
687347.26	4952449.43	361.05	OAK	771		3.1	1.6
687346.09	4952449.17	360.99	OAK	772		2.6	1.7
687346.68	4952447.42	360.84	OAK	773		2.7	1.3
687349.28	4952444.43	360.24	OAK	774		2.3	1.8
687346.44	4952444.64	360.41	OAK	775		2.8	1.6

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687345.77	4952444.24	360.38	OAK	776		2.6	1.6
687346.16	4952445.56	360.68	OAK	777		2.5	2.2
687341.53	4952444.78	361.00	OAK	778		3.3	1.8
687339.27	4952445.86	361.27	OAK	779		2.3	0.8
687337.91	4952443.29	361.12	PINE	780		6	5.2
687336.76	4952442.12	360.96	PINE	781		5.3	4.7
687334.90	4952440.83	360.92	PINE	782		5	4.3
687332.68	4952438.89	360.72	PINE	783		4.6	4.3
687334.10	4952435.44	360.23	OAK	784		7.8	4.2
687336.26	4952436.70	360.23	OAK	785		5.8	2.9
687336.13	4952437.57	360.43	OAK	786		5.8	2.8
687334.27	4952436.23	360.32	OAK	787		4.9	1.8
687335.00	4952437.39	360.61	OAK	788		5.6	1.7
687332.43	4952431.20	359.76	OAK	789		0.8	1.3
687329.25	4952438.88	361.20	OAK	790		7.2	6.4
687327.83	4952436.61	360.88	OAK	791		3	1.4
687328.67	4952435.61	360.79	OAK	792		2	1.4
687328.17	4952435.54	360.80	OAK	793		6.4	3.1

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687329.47	4952440.67	361.47	OAK	794		2.6	1.6
687329.93	4952439.44	361.21	OAK	795		2.6	1.4
687330.53	4952440.54	361.26	OAK	796		2.7	1.8
687327.69	4952449.03	362.66	OAK	797		1.8	1.1
687325.70	4952450.78	363.19	OAK	798		2.6	1.3
687325.59	4952450.10	363.05	OAK	799		2	0.9
687324.98	4952451.83	363.49	OAK	800		2.5	2
687324.59	4952444.39	362.31	OAK	801		1.7	1.2
687321.21	4952446.85	362.93	OAK	802		3.4	1.4
687320.64	4952445.61	362.77	OAK	803		3.2	1.2
687320.74	4952443.41	362.46	OAK	804		3.1	1.1
687321.33	4952441.41	362.09	OAK	805		2.1	1.1
687320.88	4952440.02	361.83	OAK	806		1.9	0.9
687320.25	4952441.14	362.14	OAK	807		2.1	0.7
687319.85	4952444.06	362.66	OAK	808		4.4	1.4
687319.15	4952444.11	362.66	OAK	809		4.6	1.7
687314.69	4952440.91	362.35	OAK	810		6.2	6.5
687325.02	4952434.99	361.05	OAK	811		2.9	1.6

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687324.93	4952433.68	360.84	OAK	812		2.7	1.2
687323.66	4952433.44	360.91	OAK	813		1.9	0.8
687322.75	4952434.82	361.12	OAK	814		2.5	1.5
687323.92	4952425.92	360.10	PINE	815		3.9	4.8
687321.25	4952421.92	359.84	OAK	816		3.5	1.7
687321.54	4952414.16	359.10	OAK	817		6	5.5
687320.76	4952409.88	358.88	OAK	818		3	3.3
687313.72	4952419.38	360.41	OAK	819		8.6	6.8
687302.54	4952413.60	361.46	OAK	820		1.3	0.6
687301.62	4952421.43	361.59	PINE	821		2.1	1.2
687300.31	4952423.14	361.69	PINE	822		2.7	3.3
687300.32	4952430.56	361.90	PINE	823		5.5	6.7
687298.54	4952416.26	361.98	PINE	824		5.1	4.9
687296.37	4952417.14	362.18	PINE	825		6	5.6
687291.87	4952414.29	362.69	PINE	826		2.2	1.9
687290.30	4952416.22	362.80	PINE	827		2.3	1.9
687291.46	4952417.20	362.56	PINE	828		2	1.7
687295.29	4952419.87	362.16	PINE	829		6.1	4.3

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687286.67	4952412.21	363.34	OAK	830		5.4	5.1
687288.35	4952404.90	363.21	OAK	831		3.8	1.6
687288.91	4952402.72	362.88	OAK	832		3.5	1.8
687287.59	4952401.82	362.82	OAK	833		3.6	1.3
687285.88	4952400.89	362.94	OAK	834		3	1.1
687285.02	4952400.20	362.88	OAK	835		3.6	1.5
687285.26	4952400.81	363.00	OAK	836		3.7	1.4
687286.14	4952402.09	363.02	OAK	837		4.2	1.3
687295.76	4952400.58	361.84	OAK	838		3.1	3.1
687298.05	4952399.13	361.20	OAK	839		1	0.7
687300.63	4952400.84	361.15	OAK	840		1	0.7
687301.36	4952398.46	360.71	OAK	841		1.6	1.3
687297.37	4952391.21	360.44	OAK	842		3.1	1.7
687297.74	4952390.73	360.28	OAK	843		1.8	1.4
687292.03	4952388.59	360.73	OAK	844		1.4	1.1
687292.67	4952388.56	360.63	OAK	845		1.1	0.9
687292.50	4952386.20	360.42	OAK	846		0.7	0.9
687293.90	4952387.88	360.33	OAK	847		1	0.5

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687293.81	4952386.98	360.19	OAK	848		0.6	0.5
687293.40	4952385.16	360.06	OAK	849		0.9	0.9
687295.03	4952385.68	360.05	OAK	850		1	0.8
687295.57	4952383.57	359.79	OAK	851		1.6	1
687301.07	4952381.09	358.86	OAK	852		0.7	0.7
687303.03	4952380.11	358.44	OAK	853		2.3	1.9
687300.44	4952377.08	358.54	OAK	854		3.2	2.5
687300.18	4952376.51	358.48	OAK	855		3.2	2.5
687296.49	4952376.27	358.96	OAK	856		2.5	1.4
687296.92	4952375.68	358.78	OAK	857		1.4	1.1
687299.60	4952360.60	356.63	OAK	858		2.8	1.4
687300.43	4952360.93	356.46	OAK	859		2.1	1
687300.38	4952362.73	356.86	OAK	860		3.1	2.1
687301.35	4952363.05	356.78	OAK	861		2.8	1.2
687301.92	4952362.70	356.53	OAK	862		2.1	1.2
687308.59	4952364.06	356.01	OAK	863		2	1.7
687308.49	4952364.95	356.07	OAK	864		1.6	1.2
687308.10	4952366.31	356.34	OAK	865		2.4	1.6

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687308.16	4952366.95	356.36	OAK	866		2.2	1.6
687307.26	4952366.45	356.36	OAK	867		3.1	1.3
687310.51	4952370.70	356.44	OAK	868		1.8	1.1
687310.25	4952371.18	356.57	OAK	869		2.2	1.4
687313.31	4952374.64	356.49	OAK	870		1.7	0.9
687313.15	4952373.43	356.43	OAK	871		2.2	1.2
687314.29	4952373.12	356.20	OAK	872		2	1.3
687314.21	4952373.62	356.29	OAK	873		2	1.5
687316.62	4952367.58	355.38	OAK	874		1.7	1.2
687319.61	4952369.85	355.24	OAK	875		1.7	1
687319.50	4952370.70	355.47	OAK	876		3.3	2.3
687326.13	4952380.61	355.48	OAK	877		1.6	1.1
687326.66	4952382.97	355.68	OAK	878		1.5	1.3
687324.41	4952387.74	356.37	OAK	879		1.4	0.9
687319.29	4952387.08	356.95	OAK	880		1.3	0.8
687321.08	4952392.01	357.23	OAK	881		0.7	0.9
687308.77	4952402.76	360.07	OAK	882		1.3	1.1
687324.02	4952402.03	357.86	OAK	883		2	1.2

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687325.75	4952405.65	357.82	OAK	884		1.3	1.3
687335.77	4952415.12	357.48	OAK	885		1	1.3
687337.29	4952418.82	357.87	OAK	886		1	1
687353.10	4952418.12	356.36	OAK	887		1.9	1.6
687353.74	4952417.68	356.23	OAK	888		0.8	0.6
687355.49	4952421.24	356.45	OAK	889		0.6	1
687359.25	4952410.58	355.19	OAK	890		1	0.8
687360.89	4952409.56	355.01	OAK	891		1	0.9
687353.79	4952406.52	355.14	OAK	892		1.4	1
687353.20	4952405.80	355.15	OAK	893		0.7	0.4
687349.25	4952405.73	355.43	OAK	894		0.9	0.6
687357.11	4952403.27	354.88	OAK	895		1.9	1.8
687362.54	4952404.16	354.60	OAK	896		0.5	0.7
687366.40	4952404.77	354.46	OAK	897		0.7	0.5
687366.49	4952406.58	354.48	OAK	898		0.6	0.8
687363.33	4952412.70	355.12	OAK	899		0.6	0.6
687366.72	4952424.83	356.08	OAK	900		1.1	0.9
687367.05	4952425.44	356.11	OAK	901		1.7	1.1

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687366.51	4952425.88	356.19	OAK	902		1.2	0.6
687367.24	4952431.10	356.68	OAK	903		1.1	0.6
687365.72	4952431.29	356.88	OAK	904		1.2	1.4
687365.85	4952432.08	356.98	OAK	905		2.3	1.6
687360.63	4952428.13	356.96	OAK	906		3	1.4
687359.71	4952428.48	357.04	OAK	907		1.4	0.8
687359.69	4952428.76	357.13	OAK	908		2	0.9
687359.78	4952429.02	357.17	OAK	909		2.2	0.9
687360.07	4952428.71	357.16	OAK	910		2.1	1
687357.25	4952428.86	357.32	OAK	911		1.9	1
687357.02	4952429.20	357.36	OAK	912		1.9	1
687345.12	4952430.01	358.41	OAK	913		0.7	0.6
687345.68	4952432.57	358.66	OAK	914		1.1	1
687347.92	4952434.31	358.79	OAK	915		1.3	0.8
687351.83	4952437.02	358.84	OAK	916		0.7	0.8
687351.49	4952437.84	359.01	OAK	917		0.8	0.5
687352.94	4952438.19	358.94	OAK	918		2	1.1
687352.53	4952438.57	359.03	OAK	919		1.3	0.8

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687353.05	4952437.68	358.85	OAK	920		1.2	0.7
687357.18	4952438.07	358.54	OAK	921		1.3	0.8
687358.67	4952439.03	358.61	OAK	922		0.5	0.5
687368.80	4952443.94	358.13	OAK	923		0.8	0.2
687368.86	4952443.24	358.06	OAK	924		0.6	0.3
687368.76	4952442.80	358.05	OAK	925		0.7	0.3
687370.68	4952442.79	357.75	OAK	926		1.3	0.6
687371.13	4952442.72	357.70	OAK	927		1	0.8
687377.30	4952434.83	356.20	OAK	928		2	1.1
687376.88	4952433.22	356.11	OAK	929		2.7	2
687377.89	4952429.25	355.62	OAK	930		2.1	1.2
687379.77	4952431.71	355.74	OAK	931		2.5	1.7
687379.86	4952432.44	355.84	W. CHERRY	932		2.9	2.9
687386.14	4952441.70	356.34	OAK	933		0.8	0.5
687386.70	4952441.48	356.28	OAK	934		0.8	0.6
687391.17	4952434.10	355.37	OAK	935		0.7	0.9
687399.30	4952439.81	355.45	OAK	936		1.2	1
687403.46	4952439.61	355.11	OAK	937		1.6	1

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687403.20	4952439.44	355.10	OAK	938		1.2	0.9
687398.09	4952444.10	355.85	OAK	939		1.1	1
687398.16	4952444.60	355.92	OAK	940		1.2	1.1
687394.41	4952444.40	356.04	OAK	941		0.5	0.4
687392.97	4952453.00	357.26	OAK	942		0.6	0.4
687392.34	4952453.39	357.37	OAK	943		1.4	0.7
687390.07	4952462.04	358.66	W. CHERRY	944		0.8	0.9
687400.69	4952467.77	358.64	OAK	945		10.3	7.5
687400.35	4952469.50	358.80	OAK	946		10.3	6.6
687401.57	4952468.59	358.68	OAK	947		10.3	5.5
687387.79	4952479.08	361.27	OAK	948		1.5	1.5
687389.97	4952484.04	361.78	OAK	949		0.5	0.6
687385.48	4952488.19	362.73	OAK	950		7.8	6.3
687395.10	4952488.16	362.09	OAK	951		7.8	6.3
687402.06	4952497.52	362.53	OAK	952		5.9	3.3
687404.25	4952506.16	363.22	OAK	953		7.5	4.9
687402.96	4952507.19	363.47	OAK	954		1.2	1.5
687413.83	4952495.13	360.60	OAK	955		1	0.6

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687411.30	4952478.91	359.00	OAK	956		8.6	8
687405.97	4952472.82	358.62	OAK	957		1.9	3.1
687408.36	4952478.92	359.07	OAK	958		0.6	0.4
687408.53	4952483.58	359.85	OAK	959		1.1	0.8
687407.10	4952487.97	360.57	OAK	960		0.6	0.5
687406.75	4952488.50	360.65	OAK	961		0.7	0.6
687407.13	4952489.21	360.80	OAK	962		0.9	0.8
687406.21	4952489.05	360.90	OAK	963		1.1	0.7
687404.71	4952493.21	361.52	OAK	964		1	0.6
687420.96	4952485.90	358.88	OAK	965		0.8	0.7
687421.14	4952486.99	358.90	OAK	966		1.5	0.6
687424.61	4952486.64	358.66	OAK	967		1.3	0.9
687424.51	4952480.36	358.02	OAK	968		1.5	1.4
687426.63	4952484.52	358.04	OAK	969		0.4	0.6
687431.86	4952487.35	357.98	OAK	970		0.45	1
687430.99	4952494.06	359.03	OAK	971		4.5	3.9
687431.22	4952494.86	358.86	OAK	972		8.2	6
687436.20	4952499.03	359.04	OAK	973		0.5	0.6

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687435.73	4952500.00	359.06	OAK	974		0.5	0.7
687443.16	4952496.76	358.12	OAK	975		1.1	0.9
687446.94	4952499.64	358.29	OAK	976		1.1	0.9
687445.71	4952501.76	358.53	OAK	977		0.7	0.7
687444.30	4952507.14	359.47	OAK	978		1.3	1.2
687440.71	4952505.36	359.59	OAK	979		1.7	1.6
687440.61	4952505.85	359.63	OAK	980		1.5	1.8
687440.59	4952509.48	360.13	OAK	981		1.8	1.7
687440.18	4952509.22	360.11	OAK	982		2.2	1.4
687439.71	4952508.87	360.10	OAK	983		1.2	1
687437.38	4952508.32	360.16	OAK	984		0.7	0.5
687437.05	4952509.24	360.38	OAK	985		0.8	0.5
687437.81	4952510.75	360.44	OAK	986		0.7	0.3
687435.92	4952510.76	360.75	OAK	987		0.9	0.8
687435.40	4952511.18	360.86	OAK	988		0.8	0.8
687435.73	4952511.92	360.97	OAK	989		0.6	0.6
687434.45	4952507.20	360.39	OAK	990		0.3	0.5
687434.71	4952506.25	360.19	OAK	991		0.8	0.5

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687434.51	4952514.20	361.44	OAK	992		0.7	0.5
687434.13	4952514.41	361.52	OAK	993		0.8	0.5
687433.81	4952513.54	361.44	OAK	994		0.8	0.4
687434.57	4952521.74	362.57	OAK	995			
687434.35	4952522.75	362.70	OAK	996		1.9	1.5
687434.35	4952522.75	362.70	OAK	997		1.2	1.1
687434.15	4952522.21	362.60	OAK	998		1.5	1.4
687436.55	4952527.59	363.27	OAK	999		4	2.7
687436.49	4952528.22	363.39	OAK	1000		4.4	3.3
687434.16	4952532.30	364.37	OAK	1001		4.4	3.8
687438.20	4952539.20	364.96	OAK	1002		2.8	1.33
687435.02	4952546.85	366.55	OAK	1003		2.1	1.2
687438.60	4952552.17	366.60	OAK	1004		1	0.7
687443.00	4952548.10	365.70	OAK	1005		1	0.8
687443.60	4952548.24	365.68	OAK	1006		1	0.6
687440.95	4952541.48	365.27	OAK	1007		3.6	1.9
687440.51	4952542.28	365.34	OAK	1008		3	1.4
687440.22	4952541.91	365.39	OAK	1009		1.5	0.8

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687444.32	4952540.78	364.54	OAK	1010		0.7	0.5
687444.23	4952539.06	364.25	OAK	1011		0.5	0.4
687446.35	4952537.94	363.65	OAK	1012		1.5	1.7
687446.65	4952538.44	363.79	OAK	1013		2.1	1
687447.11	4952538.46	363.70	OAK	1014		1.7	0.9
687447.77	4952535.63	363.20	OAK	1015		1	0.6
687447.25	4952532.59	362.76	OAK	1016		1.9	1.1
687446.84	4952532.58	362.76	OAK	1017		1.1	1.1
687446.49	4952530.02	362.45	OAK	1018		1.2	1.4
687446.69	4952529.15	362.32	OAK	1019		1.7	1.4
687447.18	4952529.23	362.23	OAK	1020		1.7	1.2
687445.10	4952527.34	362.16	OAK	1021		1.2	0.9
687444.67	4952527.07	362.10	OAK	1022		1	0.8
687441.02	4952527.01	362.59	OAK	1023		0.6	0.5
687447.38	4952525.38	361.57	OAK	1024		0.9	0.7
687447.68	4952525.61	361.61	OAK	1025		1.1	0.6
687449.03	4952526.26	361.61	OAK	1026		3.4	2.7
687449.57	4952526.73	361.62	OAK	1027		3.5	2

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687447.48	4952520.21	360.79	OAK	1028		0.8	0.7
687446.47	4952521.00	361.03	OAK	1029		0.6	0.5
687445.61	4952520.10	360.94	OAK	1030		0.4	0.4
687447.19	4952519.43	360.69	OAK	1031		0.8	0.7
687448.15	4952517.27	360.37	OAK	1032		1.4	0.8
687448.74	4952517.29	360.30	OAK	1033		1.2	0.9
687448.25	4952516.87	360.28	OAK	1034		1.1	1
687444.29	4952516.32	360.56	OAK	1035		0.5	0.5
687447.14	4952509.63	359.46	OAK	1036		0.7	0.8
687453.45	4952510.89	359.12	OAK	1037		6.5	3.2
687453.02	4952510.99	359.12	OAK	1038		7.5	6.4
687459.57	4952512.35	358.67	PINE	1039		4.5	5.8
687454.12	4952503.84	358.12	OAK	1040		0.8	1.2
687454.11	4952504.52	358.15	OAK	1041		0.5	0.6
687454.71	4952504.30	358.11	OAK	1042		1.1	0.5
687455.76	4952504.82	358.05	OAK	1043		0.6	0.6
687456.28	4952504.99	358.05	OAK	1044		0.9	0.6
687452.00	4952485.97	356.18	OAK	1045		0.7	0.5

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687457.19	4952489.10	356.17	OAK	1046		0.7	0.7
687462.41	4952492.52	356.17	OAK	1047		1.1	0.8
687462.55	4952493.03	356.22	OAK	1048		1.4	1.1
687462.58	4952493.65	356.32	OAK	1049		1.1	1
687463.50	4952494.62	356.29	OAK	1050		1.1	0.9
687463.69	4952495.04	356.29	OAK	1051		1.4	0.8
687463.09	4952494.99	356.34	OAK	1052		1.5	0.8
687467.55	4952492.45	355.83	OAK	1053		3.6	2.5
687464.55	4952489.07	355.78	W. CHERRY	1054		2.9	3.2
687463.46	4952496.96	356.64	OAK	1055		5.8	5.4
687466.30	4952500.40	356.77	OAK	1056		5.4	3.6
687462.63	4952497.16	356.69	OAK	1057		6.3	5.1
687469.82	4952507.98	357.26	OAK	1058		0.9	0.8
687474.58	4952509.56	356.94	OAK	1059		1.6	1.3
687474.27	4952521.49	358.57	OAK	1060		2.3	2.2
687469.84	4952530.49	360.02	OAK	1061		1.4	1.9
687477.19	4952532.95	359.51	OAK	1062		1.3	1.4
687476.27	4952531.04	359.41	OAK	1063		0.4	0.6

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687476.89	4952529.42	359.14	OAK	1064		0.5	0.4
687480.96	4952526.02	358.36	OAK	1065		1.1	0.5
687481.34	4952525.94	358.25	OAK	1066		0.9	0.7
687482.90	4952526.31	358.21	OAK	1067		0.5	0.5
687480.29	4952520.59	357.78	OAK	1068		0.7	0.5
687484.12	4952519.59	357.31	OAK	1069		0.7	0.6
687491.27	4952537.51	358.96	OAK	1070		1.4	1
687486.39	4952535.78	359.10	OAK	1071		0.4	0.5
687485.46	4952535.25	359.15	OAK	1072		0.6	0.4
687499.82	4952534.79	358.11	OAK	1073		0.8	0.8
687501.32	4952527.31	357.18	OAK	1074		10	7.2
687505.12	4952531.61	357.55	OAK	1075		7.5	4.9
687505.42	4952532.49	357.67	OAK	1076		7.5	4.9
687509.29	4952535.20	357.63	OAK	1077		1	0.8
687522.20	4952536.05	356.98	OAK	1078		7.5	4.4
687511.56	4952542.98	358.46	OAK	1079		0.6	0.5
687512.61	4952552.29	359.95	OAK	1080		2.7	2.1
687514.45	4952558.85	361.04	OAK	1081		4.4	2.6

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687515.74	4952558.98	360.92	OAK	1082		3.9	2.4
687514.91	4952559.64	361.25	OAK	1083		4.4	3.1
687517.94	4952560.78	361.03	OAK	1084		0.7	0.7
687519.24	4952564.28	361.43	OAK	1085		0.6	0.5
687523.21	4952568.27	361.66	OAK	1086		4	3.2
687504.69	4952578.91	364.76	OAK	1087		1.1	1.1
687499.17	4952577.90	364.65	W. CHERRY	1088		3	3
687494.45	4952566.31	363.08	OAK	1089		9.5	6.4
687493.96	4952563.71	362.72	OAK	1090		4.2	3.2
687494.61	4952563.18	362.60	OAK	1091		1.6	0.9
687491.31	4952561.17	362.49	OAK	1092		2.9	1.4
687491.59	4952561.79	362.58	OAK	1093		3	1.2
687488.80	4952563.23	363.22	OAK	1094		8	4.6
687485.63	4952559.32	362.72	OAK	1095		3.2	1.7
687487.29	4952558.63	362.39	OAK	1096		2.2	1.9
687491.78	4952557.65	361.97	OAK	1097		0.5	0.7
687493.09	4952557.41	361.81	OAK	1098		1	0.8
687492.27	4952559.57	362.07	OAK	1099		0.8	0.8

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687497.37	4952562.30	362.28	OAK	1100		0.9	0.5
687492.65	4952542.18	359.52	OAK	1101		3.3	3.3
687493.46	4952542.03	359.42	OAK	1102		3.3	3.3
687493.06	4952541.90	359.46	OAK	1103		3.3	3.3
687488.32	4952543.43	359.96	OAK	1104		0.5	0.5
687483.07	4952546.87	360.94	OAK	1105		0.7	0.5
687480.71	4952550.54	361.72	OAK	1106		0.7	0.5
687479.98	4952550.52	361.72	OAK	1107		1	0.9
687478.58	4952552.88	362.07	OAK	1108		1.8	1.1
687477.72	4952552.87	362.16	OAK	1109		2.3	1.4
687477.11	4952553.47	362.26	OAK	1110		1.7	1.6
687473.80	4952552.28	362.41	OAK	1111		3.2	1.9
687473.32	4952551.02	362.24	OAK	1112		1.7	1
687473.89	4952550.29	362.02	OAK	1113		1.4	1.1
687475.53	4952556.35	362.79	OAK	1114		9	5.2
687474.37	4952557.43	363.06	OAK	1115		9	5
687470.21	4952558.59	363.37	OAK	1116		1.5	0.9
687470.55	4952559.27	363.49	OAK	1117		1.7	1.2

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687469.45	4952558.78	363.45	OAK	1118		2.1	0.9
687473.31	4952566.90	364.68	OAK	1119		7.6	5.9
687471.49	4952568.10	364.80	OAK	1120		1.5	2
687472.59	4952573.18	365.46	OAK	1121		1.8	1.4
687464.63	4952566.55	364.71	OAK	1122		2.2	1.8
687463.36	4952524.13	359.94	OAK	1123		9.5	6.9
687463.03	4952523.51	359.83	OAK	1124		9.5	6.9
687459.91	4952535.00	361.69	OAK	1125		2.4	1.6
687459.13	4952535.06	361.83	OAK	1126		2.1	1.2
687432.77	4952442.03	353.18	OAK	1127		1.4	0.9
687442.25	4952433.17	352.51	OAK	1128		0.9	0.8
687442.51	4952416.94	352.66	PINE	1129		2.4	2.2
687434.76	4952418.78	352.45	OAK	1130		1.3	0.7
687434.39	4952419.24	352.46	OAK	1131		1.5	1.1
687431.76	4952429.94	352.55	W. CHERRY	1132		1.2	2.4
687425.80	4952424.15	352.53	OAK	1133		0.7	0.9
687415.22	4952429.14	353.44	OAK	1134		0.8	0.9
687414.82	4952428.83	353.43	OAK	1135		0.8	0.6

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687413.44	4952425.72	353.52	OAK	1136		1.5	1.7
687410.08	4952427.23	353.72	W. CHERRY	1137		1	2.1
687408.40	4952422.98	353.59	OAK	1138		0.8	0.6
687408.05	4952423.08	353.61	OAK	1139		1	0.8
687387.97	4952426.43	354.92	OAK	1140		0.7	0.7
687388.51	4952424.98	354.77	OAK	1141		0.7	0.4
687391.62	4952414.65	354.20	OAK	1142		0.6	0.7
687390.10	4952411.27	354.23	OAK	1143		0.9	0.6
687390.14	4952410.80	354.22	OAK	1144		1.4	1
687386.34	4952406.43	354.27	OAK	1145		1	0.9
687387.11	4952405.42	354.26	OAK	1146		1.4	0.7
687387.77	4952404.65	354.32	OAK	1147		0.6	0.6
687389.17	4952406.21	354.27	OAK	1148		1	0.5
687388.11	4952407.18	354.24	OAK	1149		1.2	0.7
687388.91	4952406.79	354.24	OAK	1150		1	0.8
687389.84	4952407.58	354.25	OAK	1151		0.8	0.5
687393.75	4952406.67	354.17	OAK	1152		1.4	1
687400.70	4952403.30	353.86	OAK	1153		1	1

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687395.14	4952401.47	354.19	OAK	1154		2.2	1.6
687395.10	4952402.08	354.19	OAK	1155		1.5	0.7
687392.86	4952401.83	354.34	OAK	1156		1.2	1.2
687390.84	4952402.40	354.26	OAK	1157		1.1	1.1
687390.09	4952400.29	354.27	PINE	1158		1	1.1
687391.19	4952400.43	354.27	PINE	1159		1.6	1.6
687394.97	4952398.18	354.23	OAK	1160		1.2	0.8
687395.13	4952397.17	354.22	OAK	1161		1.1	0.6
687403.04	4952395.32	353.71	OAK	1162		1.33	1.1
687403.82	4952395.29	353.65	OAK	1163		1	1.1
687405.56	4952394.97	353.51	OAK	1164		1	1.1
687415.41	4952392.85	352.69	OAK	1165		0.6	0.6
687418.89	4952391.91	352.50	W. CHERRY	1166		0.7	1.1
687421.79	4952383.82	352.53	OAK	1167		0.5	0.5
687411.68	4952381.27	353.29	OAK	1168		0.4	0.3
687410.08	4952382.14	353.38	OAK	1169		0.5	0.6
687409.49	4952381.79	353.40	OAK	1170		0.6	0.7
687402.63	4952377.72	353.65	OAK	1171		1	0.7

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687402.15	4952377.39	353.61	OAK	1172		1	0.9
687397.87	4952374.97	353.68	OAK	1173		0.9	0.5
687399.41	4952372.79	353.62	OAK	1174		1.2	1.3
687400.18	4952372.33	353.57	OAK	1175		0.8	1
687398.88	4952364.79	353.52	OAK	1176		0.6	0.4
687404.78	4952358.00	353.34	OAK	1177		0.7	0.7
687399.59	4952351.57	353.40	OAK	1178		2.1	1.3
687397.33	4952355.64	353.44	OAK	1179		0.6	0.7
687399.30	4952356.72	353.39	OAK	1180		0.6	0.6
687392.22	4952363.43	353.63	OAK	1181		0.7	0.6
687392.85	4952366.83	353.67	OAK	1182		2	1.2
687391.11	4952367.30	353.69	OAK	1183		1.3	1.4
687391.57	4952368.91	353.69	OAK	1184		0.7	1
687393.54	4952383.78	353.98	OAK	1185		1.1	0.8
687394.20	4952385.39	354.05	OAK	1186		1.4	1.6
687391.94	4952389.50	354.25	OAK	1187		1	1
687390.66	4952389.67	354.22	OAK	1188		0.9	0.8
687390.06	4952388.56	354.19	OAK	1189		1.4	1.1

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687388.74	4952389.11	354.29	OAK	1190		1.5	1.1
687388.21	4952389.04	354.22	OAK	1191		1.3	1.3
687384.16	4952385.83	354.16	OAK	1192		1.8	1.1
687383.98	4952384.36	354.13	OAK	1193		2.2	1.5
687383.16	4952384.45	354.16	OAK	1194		1	0.7
687381.52	4952384.09	354.28	OAK	1195		1.2	1.4
687381.13	4952382.69	354.10	OAK	1196		0.8	0.6
687383.95	4952379.42	354.00	OAK	1197		1.3	1.2
687383.48	4952380.53	354.01	OAK	1198		0.7	1.4
687384.03	4952381.22	354.06	OAK	1199		0.8	0.8
687387.08	4952380.75	354.09	OAK	1200		0.7	0.9
687386.27	4952379.59	354.04	OAK	1201		1	0.7
687381.49	4952376.49	354.05	OAK	1202		0.7	0.6
687381.87	4952374.58	354.05	OAK	1203		0.7	0.4
687382.29	4952367.43	353.97	OAK	1204		1.4	0.7
687381.79	4952367.34	353.98	OAK	1205		0.4	0.5
687387.11	4952365.94	353.82	OAK	1206		0.8	0.6
687388.16	4952365.52	353.77	OAK	1207		1	0.7

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687388.31	4952363.82	353.77	OAK	1208		0.9	1.1
687381.07	4952359.14	353.92	OAK	1209		0.9	1.3
687379.06	4952352.59	353.76	OAK	1210		1.2	0.9
687385.09	4952348.91	353.55	OAK	1211		0.4	0.3
687374.00	4952345.18	353.75	OAK	1212		0.8	0.7
687371.25	4952353.27	353.90	OAK	1213		1	0.8
687368.05	4952352.87	353.88	OAK	1214		0.6	0.5
687367.38	4952355.60	354.01	OAK	1215		1.2	0.9
687368.54	4952358.01	354.12	OAK	1216		0.9	0.7
687368.32	4952358.68	354.01	OAK	1217		1	0.7
687370.40	4952361.10	354.05	OAK	1218		1.8	0.9
687370.86	4952361.39	354.13	OAK	1219		2.3	0.9
687371.68	4952361.13	354.05	OAK	1220		2.7	1.8
687371.94	4952361.53	354.09	OAK	1221		2.5	2.1
687376.73	4952360.94	353.98	W. CHERRY	1222		0.7	0.8
687371.01	4952359.33	354.07	W. CHERRY	1223		1.3	1
687372.52	4952359.88	354.06	W. CHERRY	1224		0.7	0.7
687372.33	4952365.46	354.10	OAK	1225		0.4	1.2

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687369.01	4952367.16	354.07	OAK	1226		1.4	1.3
687378.60	4952370.06	354.13	OAK	1227		0.6	0.9
687378.33	4952371.45	354.06	OAK	1228		0.8	0.9
687378.87	4952376.16	354.10	OAK	1229		0.5	0.5
687375.81	4952376.23	354.16	OAK	1230		2.8	2.4
687376.32	4952376.60	354.21	OAK	1231		2.7	1.1
687374.74	4952378.23	354.12	OAK	1232		1.7	1.5
687386.69	4952401.94	354.36	OAK	1233		0.4	0.3
687385.21	4952402.93	354.31	OAK	1234		0.6	0.8
687380.25	4952401.05	354.27	OAK	1235		0.8	0.8
687378.31	4952399.15	354.26	OAK	1236		0.5	0.5
687369.16	4952409.29	354.59	OAK	1237		0.6	0.7
687370.76	4952402.04	354.30	OAK	1238		0.6	0.7
687369.12	4952400.01	354.21	OAK	1239		0.6	0.6
687368.25	4952398.84	354.31	OAK	1240		1.1	1.1
687365.93	4952390.18	354.17	OAK	1241		0.5	0.6
687362.37	4952385.62	354.12	OAK	1242		0.6	0.8
687360.11	4952388.72	354.15	OAK	1243		1	1.7

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687358.62	4952392.54	354.25	OAK	1244		0.6	0.7
687358.52	4952385.43	354.13	OAK	1245		0.6	0.7
687359.95	4952383.10	354.11	OAK	1246		0.7	0.7
687358.10	4952383.87	354.09	OAK	1247		0.5	0.4
687350.17	4952386.19	354.21	OAK	1248		1	0.8
687348.98	4952386.49	354.22	OAK	1249		0.7	1.1
687350.30	4952379.41	354.00	OAK	1250		0.5	0.5
687356.82	4952370.86	353.97	OAK	1251		1.9	2
687356.26	4952370.72	353.93	OAK	1252		0.8	0.8
687357.97	4952368.42	354.02	OAK	1253		21	1.5
687358.09	4952367.77	353.96	OAK	1254		2	1.1
687359.38	4952367.99	354.13	OAK	1255		2.8	2.2
687359.06	4952367.66	353.95	OAK	1256		2.2	1.7
687360.98	4952367.67	353.95	OAK	1257		1.3	1.3
687363.70	4952365.89	353.94	OAK	1258		0.8	0.6
687363.69	4952366.32	353.97	OAK	1259		0.7	0.7
687365.15	4952369.10	354.09	OAK	1260		1	1.2
687352.13	4952366.09	353.88	OAK	1261		1.2	1

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687340.20	4952380.52	354.30	OAK	1262		1.2	0.8
687338.50	4952375.89	354.15	OAK	1263		1.5	1.1
687334.72	4952365.91	353.95	OAK	1264		0.6	0.5
687324.90	4952371.41	354.78	OAK	1265		0.7	1.2
687328.13	4952375.16	354.77	OAK	1266		0.4	0.3
687327.83	4952364.86	354.20	OAK	1267		1.1	0.9
687325.26	4952361.98	354.21	OAK	1268		1.7	1.4
687307.99	4952340.15	354.29	OAK	1269		0.7	1
687311.21	4952327.71	354.13	OAK	1270		0.6	0.6
687314.76	4952329.82	354.16	OAK	1271		0.7	0.7
687340.21	4952342.80	354.21	OAK	1272		0.9	1
687340.48	4952343.35	354.16	OAK	1273		1.4	1.2
687355.96	4952348.01	353.99	OAK	1274		1	0.6
687357.34	4952336.90	353.91	OAK	1275		0.8	0.9
687340.31	4952316.87	353.75	OAK	1276		1.4	1.3
687337.60	4952313.79	353.97	OAK	1277		1.1	0.8
687338.68	4952313.76	353.96	OAK	1278		0.4	0.8
687353.38	4952324.52	353.71	OAK	1279		0.8	0.5

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687360.42	4952322.22	353.53	OAK	1280		1	0.6
687360.84	4952322.01	353.53	OAK	1281		0.9	0.6
687362.07	4952322.16	353.43	OAK	1282		0.7	0.6
687366.01	4952304.35	353.63	OAK	1283		0.8	1.1
687369.37	4952316.09	353.27	OAK	1284		1.3	1.3
687370.30	4952317.30	353.29	OAK	1285		1.4	1.1
687378.80	4952316.14	353.21	OAK	1286		0.9	0.4
687384.11	4952317.73	353.21	OAK	1287		0.8	0.6
687384.97	4952318.07	353.23	OAK	1288		0.5	0.3
687384.75	4952320.36	353.30	OAK	1289		0.9	0.9
687385.26	4952320.84	353.30	OAK	1290		0.8	0.8
687386.83	4952320.15	353.27	OAK	1291		0.7	0.7
687379.22	4952327.51	353.39	OAK	1292		0.9	0.6
687379.67	4952328.02	353.39	OAK	1293		0.7	0.7
687384.66	4952330.38	353.43	OAK	1294		1.6	1.8
687385.57	4952331.23	353.38	OAK	1295		1.2	0.8
687386.18	4952330.78	353.40	OAK	1296		1.8	1.3
687397.26	4952331.47	353.20	OAK	1297		0.6	0.7

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687404.15	4952353.97	353.50	W. CHERRY	1298		1.2	0.9
687413.23	4952354.57	353.22	W. CHERRY	1299		1.9	1.3
687411.47	4952353.60	353.29	W. CHERRY	1300		1.1	0.7
687424.62	4952363.19	352.82	W. CHERRY	1301		1.4	1.2
687425.82	4952366.14	352.67	W. CHERRY	1302		1.6	1.1
687428.41	4952363.24	352.59	W. CHERRY	1303		1.3	0.7
687429.56	4952367.60	352.48	W. CHERRY	1304		1.9	1.1
687426.62	4952369.88	352.59	W. CHERRY	1305		1.4	0.6
687422.07	4952368.35	352.91	W. CHERRY	1306		1.8	1.2
687425.42	4952372.11	352.61	W. CHERRY	1307		1.4	0.9
687427.48	4952372.98	352.46	W. CHERRY	1308		1.5	1
687384.16	4952474.46	360.95	OAK	1309		9.5	5.8
687383.34	4952474.13	361.09	OAK	1310		9.5	5.8
687369.35	4952503.84	365.81	OAK	1311		1.1	1.3
687368.28	4952505.76	366.16	OAK	1312		4.5	2
687367.77	4952499.33	365.78	OAK	1313		3.3	2
687356.89	4952484.97	365.26	OAK	1314		3.4	2.9
687357.87	4952483.94	365.13	OAK	1315		2.5	1.2

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687355.05	4952472.62	364.04	OAK	1316		1.7	1.4
687355.12	4952471.38	363.88	OAK	1317		2	1.2
687354.24	4952471.25	363.92	OAK	1318		2.8	1
687353.70	4952471.54	364.08	OAK	1319		3.6	1.9
687354.20	4952470.38	363.81	OAK	1320		1.4	1.1
687358.07	4952467.37	363.06	OAK	1321		1.4	0.8
687359.05	4952469.20	363.19	OAK	1322		0.8	0.7
687339.70	4952476.69	365.37	OAK	1323		1	0.9
687334.55	4952459.28	363.53	OAK	1324		2.1	1.3
687334.17	4952460.81	363.80	PINE	1325		3.3	3.7
687329.63	4952457.56	363.81	OAK	1326		2.7	1.6
687328.78	4952457.45	363.94	OAK	1327		1.9	0.9
687333.70	4952453.34	362.79	OAK	1328		1.6	1.7
687339.62	4952448.42	361.61	OAK	1329		4.7	3.1
687324.81	4952457.50	364.24	OAK	1330		5.2	3.4
687325.96	4952458.43	364.13	OAK	1331		2.4	1.3
687323.60	4952460.23	364.78	OAK	1332		5.1	2.3
687323.07	4952459.46	364.62	OAK	1333		6.4	4.5

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687320.97	4952454.10	363.94	OAK	1334		0.7	1.4
687331.92	4952475.77	365.59	OAK	1335		2.7	1.6
687371.98	4952501.72	365.36	OAK	1336		0.7	0.8
687368.31	4952505.78	366.09	OAK	1337		4.7	2.6
687369.21	4952506.32	365.94	OAK	1338		3.9	3
687377.84	4952512.34	365.87	OAK	1339		2.6	1.9
687381.67	4952510.24	365.54	OAK	1340		2.1	1.5
687382.22	4952510.58	365.53	OAK	1341		1.2	0.7
687384.32	4952506.88	364.86	OAK	1342		0.7	0.7
687394.45	4952499.83	363.58	OAK	1343		1.9	0.9
687394.41	4952500.32	363.65	OAK	1344		2.1	1.9
687396.40	4952501.11	363.54	OAK	1345		6.2	5.2
687397.47	4952500.57	363.47	OAK	1346		5.4	3.1
687398.85	4952499.00	363.12	OAK	1347		1.7	1.2
687398.97	4952497.63	362.90	W. CHERRY	1348		1.1	0.6
687400.93	4952500.26	362.99	OAK	1349		1.1	0.7
687397.88	4952503.02	363.68	OAK	1350		3.6	2.4
687397.52	4952505.20	363.96	OAK	1351		1	0.8

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687397.10	4952505.93	364.11	OAK	1352		1.4	1.4
687396.15	4952508.99	364.39	OAK	1353		1.2	1.8
687390.24	4952509.81	365.05	OAK	1354			
687388.42	4952517.72	365.83	OAK	1355		3.1	2.3
687394.71	4952518.73	365.64	OAK	1356		7	5.3
687400.21	4952520.44	365.46	OAK	1357		0.9	1.1
687402.93	4952516.57	364.81	OAK	1357		0.8	0.8
687404.07	4952516.95	364.79	OAK	1359		0.9	0.5
687406.13	4952517.26	364.73	OAK	1360		1.1	0.7
687409.87	4952513.91	363.97	OAK	1361		1.3	0.8
687410.39	4952507.96	362.99	OAK	1362			
687409.02	4952507.45	363.12	OAK	1363			
687409.97	4952498.30	361.77	OAK	1364		5.5	5
687407.95	4952494.79	361.52	OAK	1365		0.7	0.6
687408.68	4952494.63	361.37	OAK	1366		0.6	0.6
687415.90	4952507.56	362.32	OAK	1367		0.5	0.4
687419.13	4952517.66	364.01	OAK	1368		2.1	2
687416.95	4952518.86	364.34	OAK	1369		3.4	2.1

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687423.44	4952523.91	364.36	OAK	1370		0.6	1
687424.04	4952524.05	364.33	OAK	1371		1.7	1
687421.73	4952526.58	364.90	OAK	1372		0.9	0.5
687421.97	4952528.75	365.13	OAK	1373		6	5.7
687428.20	4952528.60	364.30	OAK	1374		1.2	0.8
687427.97	4952524.25	363.67	OAK	1375		4.5	1.8
687427.66	4952523.82	363.74	OAK	1376		4.5	3.9
687428.85	4952519.92	363.04	OAK	1377		2.7	2.1
687428.25	4952519.15	363.06	OAK	1378		3.4	2.2
687426.27	4952517.52	363.11	OAK	1379		5.4	3.3
687425.75	4952517.24	363.14	OAK	1380		8.5	5
687426.64	4952514.01	362.52	OAK	1381		1.6	1
687428.13	4952510.75	361.94	OAK	1382		7	3.3
687429.05	4952510.14	361.66	OAK	1383		6.8	3
687426.43	4952507.29	361.45	OAK	1384		3.8	2.9
687426.80	4952508.06	361.57	OAK	1385		3.7	2.6
687431.54	4952537.60	365.52	OAK	1386			
687431.79	4952538.79	365.46	OAK	1387			

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687424.57	4952548.73	367.40	OAK	1388		0.9	0.6
687418.61	4952546.95	367.47	OAK	1389		0.8	0.5
687419.05	4952543.08	367.13	OAK	1390		1.3	0.9
687420.48	4952540.13	366.63	OAK	1391		0.5	0.6
687422.79	4952538.16	366.16	OAK	1392		0.6	0.7
687422.69	4952537.46	366.04	OAK	1393		0.9	0.6
687425.50	4952536.99	365.76	OAK	1394		0.5	0.5
687421.19	4952534.65	366.07	OAK	1395		0.8	0.7
687424.44	4952533.69	365.41	OAK	1396		0.5	0.4
687424.90	4952531.25	365.11	OAK	1397		0.8	0.8
687425.31	4952530.84	364.92	OAK	1398		0.7	0.6
687429.92	4952548.47	367.02	OAK	1399		0.8	0.7
687454.67	4952552.04	364.43	OAK	1400		7.5	5.9
687454.90	4952548.63	363.92	OAK	1401		0.9	0.7
687459.96	4952550.46	363.37	OAK	1402		8	6
687460.77	4952549.95	363.23	OAK	1403		8	6
687460.27	4952548.05	363.01	OAK	1404		0.7	0.7
687454.01	4952542.91	363.59	OAK	1405		10	7

EAST	NORTH	ELEV	SPECIES	NUMBER	OLD NUM	HEIGHT	WIDTH
687463.03	4952541.11	361.91	OAK	1406		0.9	0.6
687468.03	4952546.44	362.03	OAK	1407		0.9	0.7
687468.03	4952547.11	362.13	OAK	1408		1	1
687469.68	4952547.25	362.01	OAK	1409		1.1	1
687465.85	4952552.33	362.89	OAK	1410		1.3	1.2
687467.12	4952553.34	362.96	OAK	1411		1.6	0.9
687463.60	4952554.48	363.35	OAK	1412		1.7	1
687464.21	4952557.76	363.62	OAK	1413		1.1	1
687459.14	4952557.49	364.19	OAK	1414		1.8	1.6
687459.21	4952562.04	364.69	OAK	1415		1.7	2
687466.24	4952563.77	364.31	OAK	1416		6.4	4.3
687465.71	4952561.19	363.98	OAK	1417		3	1.9
687479.67	4952572.81	365.28	OAK	1418		1.6	1.5
687480.17	4952573.25	365.38	OAK	1419		7	4.7
687479.43	4952570.34	365.00	OAK	1420		1.4	1.5

Appendix C
Smart Weapons Operability Enhancement Instrumentation and Feature Survey Data

GRAYLING II SURVEY DATA; SITE A1
LAT=44deg41min50.080sec; LONG=84deg38min20.130sec; ELEVATION= 363.596m
DATUM : NAD83; GEOID: GRS80; ELEVATIONS ADJUSTED TO SWOE TERRAIN DATABASE
DATE OF LAST UPDATE : 15APR94
Agency: WES POC: Charles Hahn, 601-634-3529

Coordinates		Latitude			Longitude			Elevation	Inst.	Site	Description
Easting	Northing	DD	MM	SS.ss	DD	MM	SS.ss	(m)			
687067.0	4952030.7	44	41	50.1	84	38	20.13	363.596	EDM	A1	MET TOWER
687069.1	4952022.6	44	41	49.8	84	38	20.04	363.644	EDM	A1	SOIL TEMP PROFILE
687070.2	4952026.1	44	41	49.9	84	38	19.99	363.531	EDM	A1	SOLAR RADIOMETER
687081.6	4952035.8	44	41	50.2	84	38	19.47	362.656	EDM	A1	START SNOW/SOIL SAMPLE,LINE
687044.9	4952064.4	44	41	51.2	84	38	21.09	360.108	EDM	A1	END SNOW/SOIL SAMLE,LINE
687097.9	4951944.9	44	41	47.3	84	38	18.83	365.193	EDM	A1	CEILOMETER
687071.4	4952032.3	44	41	50.1	84	38	19.93	363.111	EDM	A1	SCINTILLOMETER A1
686485.0	4951728.4	44	41	40.8	84	38	46.93	367.113	EDM	A	BACKUP AIR STATION
687089.2	4951932.6	44	41	46.9	84	38	19.25	381.393	EDM	A1	WES CAMERA

Coordinates		Latitude			Longitude			Elevation	Inst.	Site	Description
Easting	Northing	DD	MM	SS.ss	DD	MM	SS.ss	(m)			
687088.3	4951932.8	44	41	46.9	84	38	19.27	364.971	EDM	A1	WES CAMERA GROUND
687085.6	4951890.4	44	41	45.5	84	38	19.47	370.554	EDM	A1	ARL/CRREL CAMERAS
687085.5	4951890.2	44	41	45.5	84	38	19.46	368.917	EDM	A1	ARL/CRREL SCANNER LEFT OUTSIDE
687085.5	4951890.4	44	41	45.5	84	38	19.46	368.938	EDM	A1	ARL/CRREL SCANNER LEFT INSIDE
687085.4	4951890.5	44	41	45.5	84	38	19.47	368.933	EDM	A1	ARL/CRREL SCANNER RIGHT INSIDE
687085.4	4951890.6	44	41	45.5	84	38	19.47	368.93	EDM	A1	ARL/CRREL SCANNER RIGHT OUTSIDE
687089.8	4951888.0	44	41	45.4	84	38	19.27	370.866	EDM	A1	ARL/CRREL BLACK BODY
687217.1	4952131.5	44	41	53.2	84	38	13.18	381.967	EDM	A1	TIPS CAMERA TOWER
687217.8	4952132.5	44	41	53.2	84	38	13.15	355.496	EDM	A1	TIPS CAMERA GROUND

Coordinates		Latitude			Longitude			Elevation	Inst.	Site	Description
Easting	Northing	DD	MM	SS.ss	DD	MM	SS.ss	(m)			
687086.2	4951906.2	44	41	46	84	38	19.41	367.139	EDM	A1	HDL RADAR CENTER OF ROTATION
687087.1	4951906.9	44	41	46.1	84	38	19.39	365.905	EDM	A1	HDL RADAR PLATFORM
687086.8	4951905.1	44	41	46	84	38	19.39	365.095	EDM	A1	HDL RADAR PLATFORM
687085.3	4951907.2	44	41	46.1	84	38	19.47	365.13	EDM	A1	HDL RADAR PLATFORM
687085.1	4951905.4	44	41	46	84	38	19.47	365.199	EDM	A1	HDL RADAR PLATFORM
686816.2	4951822.9	44	41	43.6	84	38	31.77	361.353	EDM	A1	HDL CALIBRATION POLE 1 (GROUND)
686816.2	4951822.9	44	41	43.6	84	38	31.77	372.069	EDM	A1	HDL CALIBRATION POLE 1 (REFLECTOR)
686846.1	4951830.3	44	41	43.8	84	38	30.43	361.092	EDM	A1	HDL CALIBRATION POLE 2 (GROUND)
686846.1	4951830.3	44	41	43.8	84	38	30.43	371.726	EDM	A1	HDL CALIBRATION POLE 2 (REFLECTOR)

Coordinates		Latitude			Longitude			Elevation	Inst.	Site	Description
Easting	Northing	DD	MM	SS.ss	DD	MM	SS.ss	(m)			
686875.2	4951837.6	44	41	44	84	38	29.08	361.430	EDM	A1	HDL CALIBRATION POLE 3 (GROUND)
686875.2	4951837.6	44	41	44	84	38	29.08	371.999	EDM	A1	HDL CALIBRATION POLE 3 (REFLECTOR)
686904.1	4951844.9	44	41	44.2	84	38	27.76	361.940	EDM	A1	HDL CALIBRATION POLE 4 (GROUND)
686904.1	4951844.9	44	41	44.2	84	38	27.76	373.069	EDM	A1	HDL CALIBRATION POLE 4 (REFLECTOR)
686934.6	4951852.4	44	41	44.4	84	38	26.36	362.426	EDM	A1	HDL CALIBRATION POLE 5 (GROUND)
686934.6	4951852.4	44	41	44.4	84	38	26.36	373.489	EDM	A1	HDL CALIBRATION POLE 5 (REFLECTOR)
686686.7	4951977.7	44	41	48.7	84	38	37.45	367.165	EDM	A1	HDL TARGET LOCATION(TREELINE)
686720.7	4951763.6	44	41	41.8	84	38	36.19	361.584	EDM	A1	HDL TARGET LOCATION(GRASSY, AREA)

Coordinates		Latitude			Longitude			Elevation	Inst.	Site	Description
Easting	Northing	DD	MM	SS.ss	DD	MM	SS.ss	(m)			
687217.9	4952131.6	44	41	53.2	84	38	13.15	355.479	EDM	A1	TIPS TOWER CORNERS
687216.6	4952131.5	44	41	53.20	84	38	13.20	355.488	EDM	A1	TIPS TOWER CORNERS
687216.4	4952133.2	44	41	53.24	84	38	13.20	355.514	EDM	A1	TIPS TOWER CORNERS
687217.7	4952133.4	44	41	53.26	84	38	13.15	355.512	EDM	A1	TIPS TOWER CORNERS
687104.7	4951951.2	44	41	47.47	84	38	18.51	365.399	EDM	A1	MISSON CONTROL
687087.2	4951890.5	44	41	45.51	84	38	19.39	364.788	EDM	A1	EAST END OF ARL/CRREL TRAILER
687078.2	4951890.7	44	41	45.53	84	38	19.80	365.193	EDM	A1	WEST END OF ARL/CRREL TRAILER
687072.4	4951887.7	44	41	45.43	84	38	20.07	365.202	EDM	A1	WEST END OF CRREL MET TRAILER
687086.1	4951886.5	44	41	45.39	84	38	19.44	364.507	EDM	A1	EAST END OF CRREL MET TRAILER

Coordinates		Latitude			Longitude			Elevation	Inst.	Site	Description
Easting	Northing	DD	MM	SS.ss	DD	MM	SS.ss	(m)			
687078.7	4951877.4	44	41	45.10	84	38	19.80	364.864	EDM	A1	EAST END OF STC TRAILER
687064.7	4951880.4	44	41	45.21	84	38	20.43	365.013	EDM	A1	WEST END OF STC TRAILER
687083.8	4951916.7	44	41	46.37	84	38	19.52	365.123	EDM	A1	EAST END OF HDL TRAILER
687075.5	4951924.3	44	41	46.63	84	38	19.88	365.369	EDM	A1	WEST END OF HDL TRAILER
687088.9	4951920.7	44	41	46.49	84	38	19.27	364.704	EDM	A1	EAST END OF MODELING TRAILER
687075.2	4951932.1	44	41	46.87	84	38	19.88	365.259	EDM	A1	WEST END OF MODELING TRAILER
687088.6	4951927.7	44	41	46.71	84	38	19.27	364.807	EDM	A1	EAST END OF WES TRAILER
687079.9	4951934.6	44	41	46.96	84	38	19.66	365.142	EDM	A1	WEST END OF WES TRAILER
687080.2	4951940.3	44	41	47.15	84	38	19.63	365.152	EDM	A1	WEST END OF WES BOOM TRUCK
687092.8	4951935.0	44	41	46.96	84	38	19.08	364.746	EDM	A1	EAST END OF ARL MET TRAILER

Coordinates		Latitude			Longitude			Elevation	Inst.	Site	Description
Easting	Northing	DD	MM	SS.ss	DD	MM	SS.ss	(m)			
687083.5	4951943.4	44	41	47.25	84	38	19.49	365.140	EDM	A1	WEST END OF ARL MET TRAILER
687096.4	4951964.6	44	41	47.90	84	38	18.89	364.848	EDM	A1	EAST END OF SWOE TRAILER
687087.0	4951975.3	44	41	48.28	84	38	19.27	365.233	EDM	A1	WEST END OF SWOE TRAILER
687216.5	4952128.3	44	41	53.11	84	38	13.20	355.440	EDM	A1	SOUTH END OF TIPS TRAILER
687215.2	4952138.9	44	41	53.44	84	38	13.26	355.655	EDM	A1	NORTH END OF TIPS TRAILER
687161.8	4952116.1	44	41	52.75	84	38	15.70	360.228	EDM	A1	ADMIN TRAILER
687170.0	4952113.2	44	41	52.64	84	38	15.35	360.223	EDM	A1	ADMIN TRAILER
686880.9	4951658.2	44	41	38.18	84	38	29.05	363.471	EDM	A1	WES MET TOWER
687029.5	4951734.9	44	41	40.54	84	38	22.21	363.308	EDM	A1	ORANGE PANEL
686882.0	4951579.4	44	41	35.63	84	38	29.10	363.123	EDM	A1	8X8 ORANGE PANEL

GRAYLING II SURVEY DATA; SITE C
LAT=44deg41min47.570sec; LONG=84deg37min54.880sec; ELEVATION= 367.757m
DATUM : NAD83; GEOID: GRS80; ELEVATIONS ADJUSTED TO SWOE TERRAIN DATABASE
DATE OF LAST UPDATE : 15APR94
Agency: WES POC: Charles Hahn, 601-634-3529

Coordinates		Latitude			Longitude			Elevation	Inst.	Site	Description
Easting	Northing	DD	MM	SS.ss	DD	MM	SS.ss	(m)			
687624.7	4951969.6	44	41	47.57	84	37	54.88	367.757	EDM	C	MET TOWER
687626.0	4951965.2	44	41	47.43	84	37	54.83	367.789	EDM	C	SOIL TEMP PROFILE
687630.0	4951976.3	44	41	47.79	84	37	54.64	368.770	EDM	C	SOLAR RADIOMETER
687573.7	4952031.6	44	41	49.62	84	37	57.11	366.209	EDM	C	START SNOW/SOIL SAMPLE LINE
687617.3	4952018.7	44	41	49.17	84	37	55.16	369.828	EDM	C	END SNOW/SOIL SAMPLE LINE
687589.2	4952029.9	44	41	49.57	84	37	56.42	367.743	EDM	C	FIDUCIAL CR1
687600.2	4952013.9	44	41	49.03	84	37	55.93	368.474	EDM	C	FIDUCIAL CR2
687644.9	4951887.1	44	41	44.88	84	37	54.09	366.151	EDM	C	FIDUCIAL CR3
687687.1	4951911.4	44	41	45.64	84	37	52.14	366.779	EDM	C	FIDUCIAL CR4
687842.6	4951472.1	44	41	31.26	84	37	45.66	361.911	EDM	C	FIDUCIAL ORANGE PANEL

Coordinates		Latitude			Longitude			Elevation	Inst.	Site	Description
Easting	Northing	DD	MM	SS.ss	DD	MM	SS.ss	(m)			
687783.1	4951529.9	44	41	33.19	84	37	48.27	359.797	EDM	C	FIDUCIAL ORANGE PANEL

GRAYLING II SURVEY DATA; SITE D
LAT=44deg42min03.360sec; LONG=84deg38min05.270sec; ELEVATION= 360.161m
DATUM : NAD83; GEOID: GRS80; ELEVATIONS ADJUSTED TO SWOE TERRAIN DATABASE
DATE OF LAST UPDATE : 15APR94
Agency: WES POC: Charles Hahn, 601-634-3529

Coordinates		Latitude			Longitude			Elevation	Inst.	Site	Description
Easting	Northing	DD	MM	SS.ss	DD	MM	SS.ss	(m)			
687381.8	4952449.9	44	42	3.36	84	38	5.27	360.161	EDM	D	MET TOWER
687387.7	4952455.2	44	42	3.52	84	38	4.99	360.494	EDM	D	SOIL TEMP PROFILE
687374.8	4952446.9	44	42	3.27	84	38	5.60	360.192	EDM	D	SOLAR RADIOMETER STAND
687344.5	4952486.6	44	42	4.58	84	38	6.91	368.193	EDM	D	START SNOW/SOIL SAMPLE LINE
687350.4	4952453.4	44	42	3.51	84	38	6.70	363.974	EDM	D	END SNOW/SOIL SAMPLE LINE
687379.5	4952452.2	44	42	3.42	84	38	5.38	360.550	EDM	D	RAIN GUAGE(TIPPING BUCKET)
687381.1	4952455.6	44	42	3.53	84	38	5.29	360.870	EDM	D	RAIN RATE GAUGE
687365.4	4952449.7	44	42	3.36	84	38	6.04	360.966	EDM	D	D1 STARING RADIOMETER 1

Coordinates		Latitude			Longitude			Elevation	Inst.	Site	Description
Easting	Northing	DD	MM	SS.ss	DD	MM	SS.ss	(m)			
687365.0	4952449.2	44	42	3.34	84	38	6.04	360.942	EDM	D	D1 STARING RADIOMETER 2
687364.4	4952449.5	44	42	3.36	84	38	6.06	361.090	EDM	D	D1 STARING RADIOMETER 3
687370.1	4952443.8	44	42	3.18	84	38	5.82	359.884	EDM	D	D1 STARING RADIOMETER 4
687359.8	4952446.3	44	42	3.27	84	38	6.28	361.595	EDM	D	D1 STARING RADIOMETER 5
687358.2	4952450.3	44	42	3.40	84	38	6.34	362.530	EDM	D	D1 STARING RADIOMETER 6
687362.4	4952453.4	44	42	3.49	84	38	6.14	362.144	EDM	D	D1 STARING RADIOMETER 7
687369.1	4952447.9	44	42	3.31	84	38	5.87	360.504	EDM	D	D1 STARING RADIOMETER 8
687364.7	4952450.7	44	42	3.40	84	38	6.06	361.188	EDM	D	D1,RADIOMETER DATALOGER'
687385.1	4952469.5	44	42	3.99	84	38	5.10	362.592	EDM	D	D2 STARING RADIOMETER 1
687380.9	4952463.5	44	42	3.79	84	38	5.29	361.877	EDM	D	D2 STARING RADIOMETER 2

Coordinates		Latitude			Longitude			Elevation	Inst.	Site	Description
Easting	Northing	DD	MM	SS.ss	DD	MM	SS.ss	(m)			
687382.1	4952468.5	44	42	3.96	84	38	5.24	362.532	EDM	D	D2 STARING RADIOMETER 3
687379.4	4952469.4	44	42	4.00	84	38	5.38	362.913	EDM	D	D2 STARING RADIOMETER 4
687383.8	4952457.8	44	42	3.61	84	38	5.18	361.040	EDM	D	D2 STARING RADIOMETER 5
687381.7	4952460.8	44	42	3.71	84	38	5.27	361.471	EDM	D	D2 STARING RADIOMETER 6
687375.9	4952467.2	44	42	3.92	84	38	5.51	362.840	EDM	D	D2 STARING RADIOMETER 7
687380.7	4952467.9	44	42	3.95	84	38	5.29	362.568	EDM	D	D2 STARING RADIOMETER 8
687382.8	4952465.5	44	42	3.86	84	38	5.21	362.086	EDM	D	D2,RADIOMETER DATALOGGER
687348.2	4952520.2	44	42	5.66	84	38	6.72	368.531	EDM	D	FIDUCIAL DR1
687357.2	4952502.1	44	42	5.07	84	38	6.34	368.694	EDM	D	FIDUCIAL DR2
687387.8	4952406.7	44	42	1.94	84	38	5.08	356.473	EDM	D	FIDUCIAL DR3
687414.2	4952420.3	44	42	2.38	84	38	3.84	355.175	EDM	D	FIDUCIAL DR4
687326.8	4952561.9	44	42	7.03	84	38	7.63	366.570	EDM	D	FIDUCIAL ORANGE PANEL

Coordinates		Latitude			Longitude			Elevation	Inst.	Site	Description
Easting	Northing	DD	MM	SS.ss	DD	MM	SS.ss	(m)			
687431.1	4952349.8	44	42	0.07	84	38	3.18	354.529	EDM	D	FIDUCIAL ORANGE PANEL
687478.6	4952252.7	44	41	56.87	84	38	1.15	354.880	EDM	D	FIDUCIAL ORANGE PANEL
687225.2	4952766.3	44	42	13.74	84	38	11.96	370.829	EDM	D	4X4 ORANGE PANEL

GRAYLING II SURVEY DATA ; SITE E
LAT=44deg41min47.640sec LONG=84deg38min12.140sec; ELEVATION= 354.11m
DATUM : NAD83; GEOID: GRS80; ELEVATIONS ADJUSTED TO SWOE TERRAIN DATABASE
DATE OF LAST UPDATE : 15APR94
Agency: WES POC: Charles Hahn, 601-634-3529

Coordinates		Latitude			Longitude			Elevation	Inst.	Site	Description
Easting	Northing	DD	MM	SS.ss	DD	MM	SS.ss	(m)			
687302.7	4952043.7	44	41	50.27	84	38	9.41	354.286	EDM	E3	MET TOWER
687301.6	4952044.3	44	41	50.31	84	38	9.44	354.349	EDM	E3	SOIL TEMP PROFILE
687304.5	4952039.2	44	41	50.13	84	38	9.33	354.287	EDM	E3	SOLAR RADIOMETER STAND
687301.5	4952036.4	44	41	50.05	84	38	9.47	354.151	EDM	E3	SOLAR TRACKER
687302.0	4952038.2	44	41	50.09	84	38	9.44	354.170	EDM	E3	SHADOW BAND
687306.3	4952043.3	44	41	50.27	84	38	9.25	354.340	EDM	E3	RAIN GUAGE(CAPACITANCE)
687305.8	4952046.1	44	41	50.35	84	38	9.25	354.331	EDM	E3	VISIBILITY SENSOR
687298.7	4952050.0	44	41	50.49	84	38	9.58	354.393	EDM	E3	ARL STARING RADIOMETER
687294.6	4952043.3	44	41	50.28	84	38	9.77	354.414	EDM	E3	TIPS STARING RADIOMETER

Coordinates		Latitude			Longitude			Elevation	Inst.	Site	Description
Easting	Northing	DD	MM	SS.ss	DD	MM	SS.ss	(m)			
687298.9	4952045.5	44	41	50.33	84	38	9.58	354.395	EDM	E3	SOIL MOISTURE PROBE(CRREL)
687284.3	4951941.0	44	41	46.96	84	38	10.37	353.774	EDM	E3	THERMISTOR 1
687279.5	4951940.3	44	41	46.94	84	38	10.59	353.711	EDM	E3	THERMISTOR 2
687283.7	4951937.2	44	41	46.84	84	38	10.40	353.781	EDM	E3	THERMISTOR 3
687285.0	4951950.1	44	41	47.26	84	38	10.33	353.746	EDM	E3	THERMISTOR 4
687280.0	4951937.8	44	41	46.87	84	38	10.57	353.703	EDM	E3	THERMISTOR 5
687282.7	4951946.2	44	41	47.13	84	38	10.44	353.718	EDM	E3	THERMISTOR 6
687277.8	4951946.4	44	41	47.14	84	38	10.66	353.717	EDM	E3	THERMISTOR 7
687283.0	4951932.6	44	41	46.69	84	38	10.44	353.765	EDM	E3	THERMISTOR 8
687278.4	4951935.3	44	41	46.79	84	38	10.65	353.832	EDM	E3	THERMISTOR 9
687284.5	4951945.2	44	41	47.10	84	38	10.36	353.762	EDM	E3	THERMISTOR 10
687275.0	4951943.9	44	41	47.07	84	38	10.79	353.673	EDM	E3	THERMISTOR 11
687286.1	4951944.1	44	41	47.06	84	38	10.29	353.787	EDM	E3	THERMISTOR 12
687277.8	4951941.0	44	41	46.97	84	38	10.67	353.704	EDM	E3	THERMISTOR 13
687281.3	4951936.4	44	41	46.82	84	38	10.52	353.735	EDM	E3	THERMISTOR 14
687283.6	4951947.6	44	41	47.18	84	38	10.39	353.750	EDM	E3	THERMISTOR 15

Coordinates		Latitude			Longitude			Elevation	Inst.	Site	Description
Easting	Northing	DD	MM	SS.ss	DD	MM	SS.ss	(m)			
687274.0	4951940.8	44	41	46.97	84	38	10.84	353.695	EDM	E3	THERMISTOR 16
687292.9	4951937.7	44	41	46.85	84	38	9.99	353.759	EDM	E3	THERMISTOR DATALOGGER
687197.7	4951901.6	44	41	45.78	84	38	14.36	354.421	EDM	E4	MET TOWER
687196.6	4951902.0	44	41	45.79	84	38	14.41	354.422	EDM	E4	SOIL TEMP PROFILE
687194.4	4951898.6	44	41	45.68	84	38	14.52	354.328	EDM	E4	SOLAR RADIOMETER STAND
687201.1	4951900.5	44	41	45.73	84	38	14.22	354.414	EDM	E4	RAIN GUAGE(CAPACITANCE)
687201.0	4951903.9	44	41	45.85	84	38	14.22	354.440	EDM	E4	VISIBLITY SENSOR
687198.6	4951898.2	44	41	45.65	84	38	14.33	354.631	EDM	E4	ARL STARING RADIOMETER
687202.5	4951902.4	44	41	45.80	84	38	14.14	354.414	EDM	E4	TIPS STARING RADIOMETER
687192.8	4951903.6	44	41	45.85	84	38	14.58	354.369	EDM	E4	SOIL MOISTURE PROBE(CRREL)
687219.9	4951988.7	44	41	48.57	84	38	13.23	354.542	EDM	E4	THERMISTOR 1
687226.8	4951993.7	44	41	48.72	84	38	12.91	354.645	EDM	E4	THERMISTOR 2

Coordinates		Latitude			Longitude			Elevation	Inst.	Site	Description
Easting	Northing	DD	MM	SS.ss	DD	MM	SS.ss	(m)			
687221.5	4951991.9	44	41	48.67	84	38	13.16	354.430	EDM	E4	THERMISTOR 3
687218.7	4951996.9	44	41	48.84	84	38	13.28	354.344	EDM	E4	THERMISTOR 4
687218.4	4951994.3	44	41	48.75	84	38	13.30	354.326	EDM	E4	THERMISTOR 5
687223.5	4951988.5	44	41	48.56	84	38	13.07	354.652	EDM	E4	THERMISTOR 6
687227.8	4951989.9	44	41	48.60	84	38	12.87	354.716	EDM	E4	THERMISTOR 7
687217.0	4951991.2	44	41	48.65	84	38	13.36	354.398	EDM	E4	THERMISTOR 8
687222.4	4951995.1	44	41	48.77	84	38	13.11	354.465	EDM	E4	THERMISTOR 9
687220.6	4951986.0	44	41	48.48	84	38	13.20	354.567	EDM	E4	THERMISTOR 10
687223.0	4951985.4	44	41	48.46	84	38	13.10	354.704	EDM	E4	THERMISTOR 11
687217.0	4951986.0	44	41	48.49	84	38	13.37	354.506	EDM	E4	THERMISTOR 12
687225.3	4951988.4	44	41	48.55	84	38	12.99	354.614	EDM	E4	THERMISTOR 13
687215.0	4951986.3	44	41	48.50	84	38	13.46	354.378	EDM	E4	THERMISTOR 14
687214.8	4951989.3	44	41	48.59	84	38	13.46	354.354	EDM	E4	THERMISTOR 15
687224.7	4951991.6	44	41	48.66	84	38	13.01	354.581	EDM	E4	THERMISTOR 16
687223.7	4951982.6	44	41	48.37	84	38	13.07	354.853	EDM	E4	THERMISTOR DATALOGGER
687315.2	4951962.7	44	41	47.63	84	38	8.95	354.278	EDM	E	EAST CORNER OF SITE E

Coordinates		Latitude			Longitude			Elevation	Inst.	Site	Description
Easting	Northing	DD	MM	SS.ss	DD	MM	SS.ss	(m)			
687242.5	4952030.7	44	41	49.91	84	38	12.16	355.435	EDM	E	NORTH CORNER OF SITE E
687173.8	4951958.8	44	41	47.66	84	38	15.37	355.814	EDM	E	WEST CORNER OF SITE E
687246.6	4951889.8	44	41	45.35	84	38	12.16	353.753	EDM	E	SOUTH CORNER OF SITE E
687317.2	4951960.1	44	41	47.55	84	38	8.87	354.266	EDM	E	EAST LINE OF 3m BUFFER
687317.4	4951964.7	44	41	47.70	84	38	8.84	354.283	EDM	E	EAST LINE OF 3m BUFFER
687244.6	4952032.8	44	41	49.99	84	38	12.05	355.246	EDM	E	NORTH LINE OF 3m BUFFER
687240.5	4952032.9	44	41	49.99	84	38	12.24	355.461	EDM	E	NORTH LINE OF 3m BUFFER
687171.5	4951956.9	44	41	47.59	84	38	15.48	355.974	EDM	E	WEST LINE OF 3m BUFFER
687172.0	4951960.8	44	41	47.72	84	38	15.46	355.968	EDM	E	WEST LINE OF 3m BUFFER
687248.7	4951887.7	44	41	45.27	84	38	12.05	353.816	EDM	E	SOUTH LINE OF 3m BUFFER

Coordinates		Latitude			Longitude			Elevation	Inst.	Site	Description
Easting	Northing	DD	MM	SS.ss	DD	MM	SS.ss	(m)			
687244.6	4951887.5	44	41	45.27	84	38	12.24	353.700	EDM	E	SOUTH LINE OF 3m BUFFER
687492.9	4952221.7	44	41	55.85	84	38	0.54	353.899	EDM	E	INTERSECTION C-D E-F
687129.0	4951915.2	44	41	46.27	84	38	17.46	358.597	EDM	E	LEFT NEAR FOV ARL/CRREL
687405.7	4952071.4	44	41	51.07	84	38	4.69	353.958	EDM	E	LEFT FAR FOV ARL/CRREL
687147.3	4951899.4	44	41	45.74	84	38	16.63	356.023	EDM	E	RIGHT NEAR FOV ARL/CRREL
687328.3	4951929.1	44	41	46.54	84	38	8.39	353.645	EDM	E	RIGHT FAR FOV ARL/CRREL
687241.4	4952054.0	44	41	50.66	84	38	12.18	355.241	EDM	E	LEFT NEAR FOV TIPS
687300.2	4951863.4	44	41	44.44	84	38	9.76	353.553	EDM	E	LEFT FAR FOV TIPS
687214.2	4952050.8	44	41	50.59	84	38	13.42	355.287	EDM	E	RIGHT NEAR FOV TIPS
687206.9	4951778.2	44	41	41.76	84	38	14.11	353.568	EDM	E	RIGHT FAR FOV TIPS
687175.7	4951902.0	44	41	45.80	84	38	15.34	356.713	EDM	E	HDL CORNER REFLECTOR 4 (REFL)

Coordinates		Latitude			Longitude			Elevation	Inst.	Site	Description
Easting	Northing	DD	MM	SS.ss	DD	MM	SS.ss	(m)			
687175.6	4951901.9	44	41	45.80	84	38	15.37	354.601	EDM	E	HDL CORNER REFLECTOR 4 (GROUND)
687307.1	4951997.9	44	41	48.79	84	38	9.27	356.779	EDM	E	HDL CORNER REFLECTOR 6 (REFL)
687307.2	4951997.8	44	41	48.79	84	38	9.24	354.689	EDM	E	HDL CORNER REFLECTOR 6 (GROUND)
687278.4	4952025.4	44	41	49.71	84	38	10.54	356.302	EDM	E	HDL CORNER REFLECTOR 5 (REFL)
687278.1	4952025.3	44	41	49.71	84	38	10.54	354.287	EDM	E	HDL CORNER REFLECTOR 5 (GROUND)
687151.7	4951862.8	44	41	44.57	84	38	16.50	354.844	EDM	E	FIDUCIAL POST ER1
687169.0	4951880.8	44	41	45.13	84	38	15.70	354.796	EDM	E	FIDUCIAL POST ER2
687182.9	4951895.3	44	41	45.60	84	38	15.04	354.476	EDM	E	FIDUCIAL POST ER3
687175.6	4951902.2	44	41	45.80	84	38	15.37	354.601	EDM	E	FIDUCIAL POST ER4
687211.2	4951903.1	44	41	45.80	84	38	13.75	354.185	EDM	E	FIDUCIAL POST ER5
687307.4	4951997.4	44	41	48.78	84	38	9.25	354.582	EDM	E	FIDUCIAL POST ER6
687292.9	4952011.1	44	41	49.22	84	38	9.91	354.147	EDM	E	FIDUCIAL POST ER7

Coordinates		Latitude			Longitude			Elevation	Inst.	Site	Description
Easting	Northing	DD	MM	SS.ss	DD	MM	SS.ss	(m)			
687278.3	4952024.9	44	41	49.69	84	38	10.54	354.314	EDM	E	FIDUCIAL POST ER8
687306.8	4952011.4	44	41	49.24	84	38	9.25	354.361	EDM	E	FIDUCIAL POST ER9 (OLD LOCATION)
687302.3	4952014.9	44	41	49.34	84	38	9.46	354.273	EDM	E	FIDUCIAL POST ER9 (NEW LOCATION)
687321.2	4952011.7	44	41	49.22	84	38	8.62	354.082	EDM	E	FIDUCIAL POST ER10
687292.1	4952039.2	44	41	50.13	84	38	9.91	354.430	EDM	E	FIDUCIAL POST ER11
687306.6	4952025.5	44	41	49.69	84	38	9.25	354.415	EDM	E	FIDUCIAL POST ER12
687262.9	4951804.7	44	41	42.57	84	38	11.52	353.015	EDM	E	WES FEATURE 1
687248.4	4951864.8	44	41	44.53	84	38	12.10	353.526	EDM	E	WES FEATURE 2
687297.6	4951843.8	44	41	43.80	84	38	9.90	353.170	EDM	E	WES FEATURE 3
687250.3	4951922.5	44	41	46.40	84	38	11.94	353.798	EDM	E	WES FEATURE 4
687196.4	4951923.8	44	41	46.49	84	38	14.39	354.003	EDM	E	WES FEATURE 5
687326.4	4951925.4	44	41	46.42	84	38	8.48	353.848	EDM	E	WES FEATURE 6
687230.0	4951932.7	44	41	46.75	84	38	12.85	354.830	EDM	E	WES FEATURE 7
687204.8	4951930.8	44	41	46.71	84	38	14.00	354.398	EDM	E	WES FEATURE 8
687423.7	4952028.2	44	41	49.66	84	38	3.93	356.322	EDM	E	WES FEATURE 9
687315.9	4952009.1	44	41	49.14	84	38	8.85	353.669	EDM	E	WES FEATURE 10

Coordinates		Latitude			Longitude			Elevation	Inst.	Site	Description
Easting	Northing	DD	MM	SS.ss	DD	MM	SS.ss	(m)			
687940.2	4952685.8	44	42	10.46	84	37	39.61	368.014	EDM	E	WES FEATURE 11
687355.7	4952440.6	44	42	3.07	84	38	6.47	360.777	EDM	E	WES FEATURE 12
687248.2	4951865.0	44	41	44.54	84	38	12.11	353.430	EDM	E	TARGET LOC1 (GRASSY1)
687263.1	4951805.1	44	41	42.59	84	38	11.53	353.277	EDM	E	TARGET LOC2 (ROADWAY)
687295.7	4951845.9	44	41	43.88	84	38	9.99	353.575	EDM	E	TARGET LOC3 (TREELINE)
687224.0	4952039.4	44	41	50.21	84	38	12.98	355.434	EDM	E	TARGET LOC4 (GRASSY2;TIPS FOREGROUND)
687217.9	4951917.0	44	41	46.25	84	38	13.42	353.939	EDM	E	TARGET LOC5 (BTR-70 IN SITE E)
687256.2	4951966.9	44	41	47.83	84	38	11.62	355.242	EDM	E	TARGET LOC6 (T-72 IN SITE E)

GRAYLING II SURVEY DATA; SITE F
LAT=44deg42min10.400sec; LONG=84deg37min39.890sec; ELEVATION= 367.520m
DATUM : NAD83; GEOID: GRS80; ELEVATIONS ADJUSTED TO SWOE TERRAIN DATABASE
DATE OF LAST UPDATE : 15APR94
Agency: WES POC: Charles Hahn, 601-634-3529

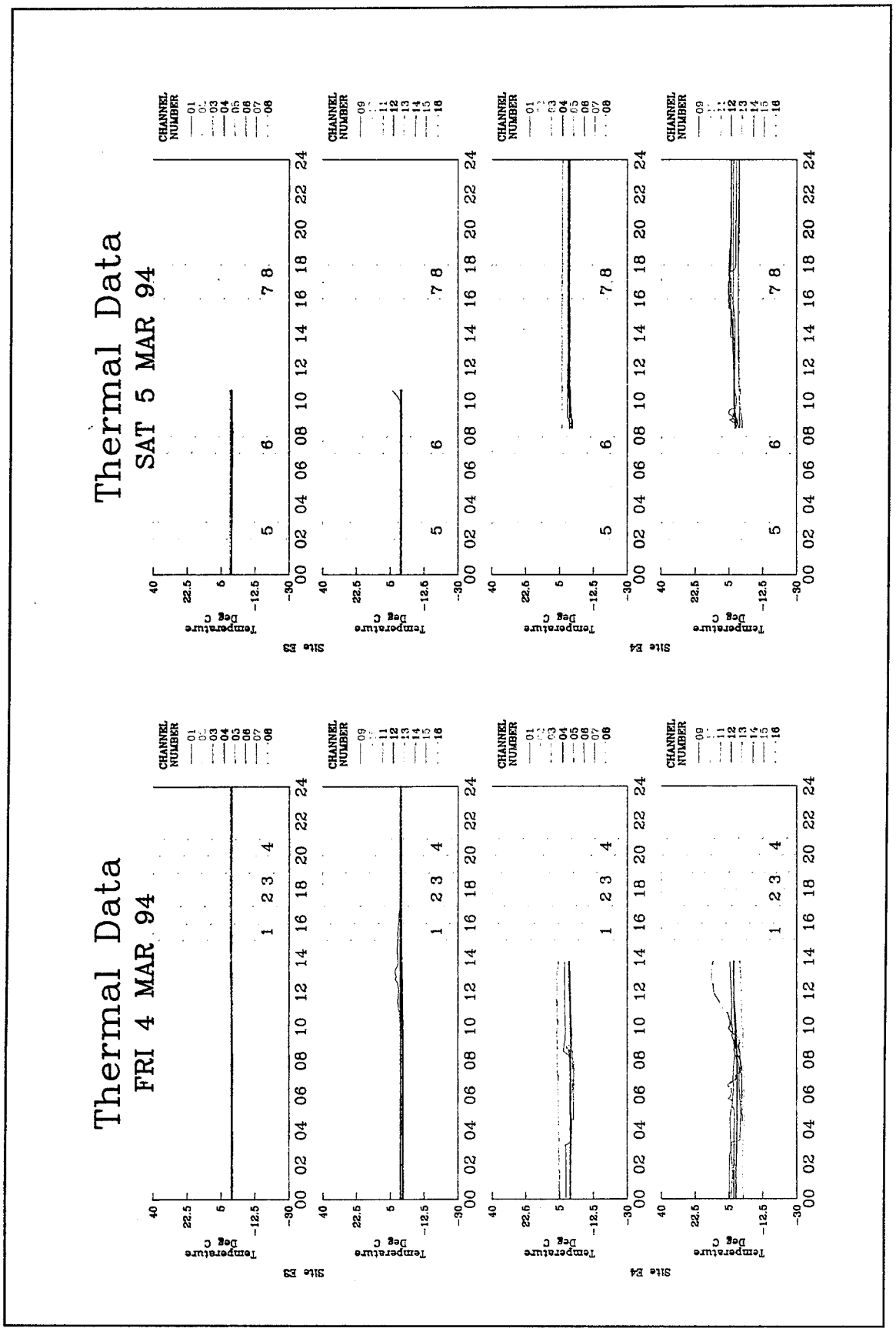
Coordinates		Latitude			Longitude			Elevation	Inst.	Site	Description
Easting	Northing	DD	MM	SS.ss	DD	MM	SS.ss	(m)			
687934.1	4952683.3	44	42	10.40	84	37	39.89	367.520	EDM	F	MET TOWER
687934.4	4952681.3	44	42	10.33	84	37	39.89	367.339	EDM	F	SOIL TEMP PROFILE
687929.5	4952678.6	44	42	10.25	84	37	40.11	366.244	EDM	F	SOLAR RADIOMETER STAND
687896.8	4952683.8	44	42	10.45	84	37	41.59	360.047	EDM	F	START SNOW/SOIL SAMPLE LINE
687893.8	4952729.7	44	42	11.92	84	37	41.67	360.000	EDM	F	END SNOW/SOIL SAMPLE LINE
687936.3	4952680.3	44	42	10.30	84	37	39.81	367.450	EDM	F	RAIN GUAGE(CAPACITANCE)
687942.5	4952696.9	44	42	10.82	84	37	39.50	369.728	EDM	F	SCINTILOMETER REFLECTOR
687856.8	4952604.3	44	42	7.91	84	37	43.51	358.289	EDM	F	FIDUCIAL FR1

Coordinates		Latitude			Longitude			Elevation	Inst.	Site	Description
Easting	Northing	DD	MM	SS.ss	DD	MM	SS.ss	(m)			
687934.1	4952683.3	44	42	10.40	84	37	39.89	367.520	EDM	F	MET TOWER
687934.4	4952681.3	44	42	10.33	84	37	39.89	367.339	EDM	F	SOIL TEMP PROFILE
687929.5	4952678.6	44	42	10.25	84	37	40.11	366.244	EDM	F	SOLAR RADIOMETER STAND
687896.8	4952683.8	44	42	10.45	84	37	41.59	360.047	EDM	F	START SNOW/SOIL SAMPLE LINE
687893.8	4952729.7	44	42	11.92	84	37	41.67	360.000	EDM	F	END SNOW/SOIL SAMPLE LINE
687870.6	4952618.7	44	42	8.35	84	37	42.86	358.927	EDM	F	FIDUCIAL FR2
687884.4	4952633.3	44	42	8.83	84	37	42.22	359.152	EDM	F	FIDUCIAL FR3
687912.7	4952634.1	44	42	8.82	84	37	40.93	359.537	EDM	F	FIDUCIAL FR4
687883.8	4952661.6	44	42	9.74	84	37	42.22	358.587	EDM	F	FIDUCIAL FR5
687967.0	4952720.3	44	42	11.57	84	37	38.35	375.461	EDM	F	FIDUCIAL FR6
687952.5	4952733.8	44	42	12.02	84	37	38.98	374.233	EDM	F	FIDUCIAL FR7
687980.9	4952734.7	44	42	12.01	84	37	37.69	376.095	EDM	F	FIDUCIAL FR8
687760.9	4952503.0	44	42	4.71	84	37	47.99	355.622	EDM	F	FIDUCIAL ORANGE PANEL

Coordinates		Latitude			Longitude			Elevation	Inst.	Site	Description
Easting	Northing	DD	MM	SS.ss	DD	MM	SS.ss	(m)			
687934.1	4952683.3	44	42	10.40	84	37	39.89	367.520	EDM	F	MET TOWER
687934.4	4952681.3	44	42	10.33	84	37	39.89	367.339	EDM	F	SOIL TEMP PROFILE
687929.5	4952678.6	44	42	10.25	84	37	40.11	366.244	EDM	F	SOLAR RADIOMETER STAND
687896.8	4952683.8	44	42	10.45	84	37	41.59	360.047	EDM	F	START SNOW/SOIL SAMPLE LINE
687893.8	4952729.7	44	42	11.92	84	37	41.67	360.000	EDM	F	END SNOW/SOIL SAMPLE LINE
688023.1	4952778.7	44	42	13.39	84	37	35.71	377.959	EDM	F	FIDUCIAL ORANGE PANEL
687588.2	4952321.9	44	41	59.01	84	37	56.06	354.805	EDM	F	FIDUCIAL ORANGE PANEL
687414.8	4952139.2	44	41	53.26	84	38	4.20	354.169	EDM	F	FIDUCIAL ORANGE PANEL
688105.4	4952867.5	44	42	16.19	84	37	31.86	377.092	EDM	F	FIDUCIAL LIGHT
687719.3	4952445.2	44	42	2.87	84	37	49.97	355.028	EDM	F	FIDUCIAL CA1(USED IN A PREVIOUS TEST)

Coordinates		Latitude			Longitude			Elevation	Inst.	Site	Description
Easting	Northing	DD	MM	SS.ss	DD	MM	SS.ss	(m)			
687934.1	4952683.3	44	42	10.40	84	37	39.89	367.520	EDM	F	MET TOWER
687934.4	4952681.3	44	42	10.33	84	37	39.89	367.339	EDM	F	SOIL TEMP PROFILE
687929.5	4952678.6	44	42	10.25	84	37	40.11	366.244	EDM	F	SOLAR RADIOMETER STAND
687896.8	4952683.8	44	42	10.45	84	37	41.59	360.047	EDM	F	START SNOW/SOIL SAMPLE LINE
687893.8	4952729.7	44	42	11.92	84	37	41.67	360.000	EDM	F	END SNOW/SOIL SAMPLE LINE
687704.9	4952458.9	44	42	3.34	84	37	50.60	355.544	EDM	F	FIDUCIAL CA2(USED IN A PREVIOUS TEST)
687718.7	4952473.5	44	42	3.81	84	37	49.94	354.255	EDM	F	FIDUCIAL CA3(USED IN A PREVIOUS TEST)
687733.2	4952459.8	44	42	3.36	84	37	49.31	355.407	EDM	F	FIDUCIAL CA4(USED IN A PREVIOUS TEST)

Appendix D
Soil Surface Temperature Summaries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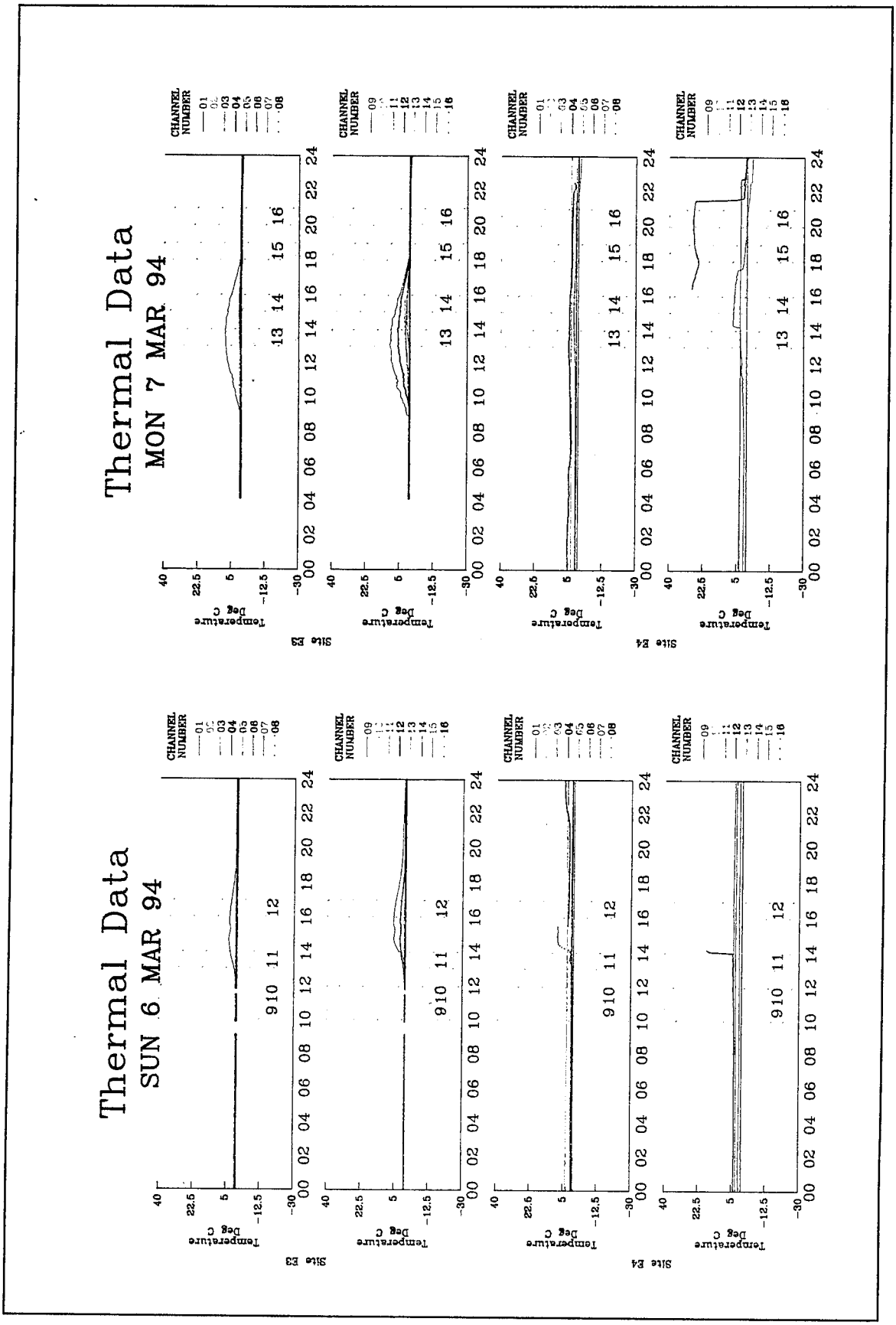
SAT 5 MAR 94
Thermal Data
FRI 4 MAR 94
CHANNEL NUMBER
Temperature Deg C
Site E3
Site E4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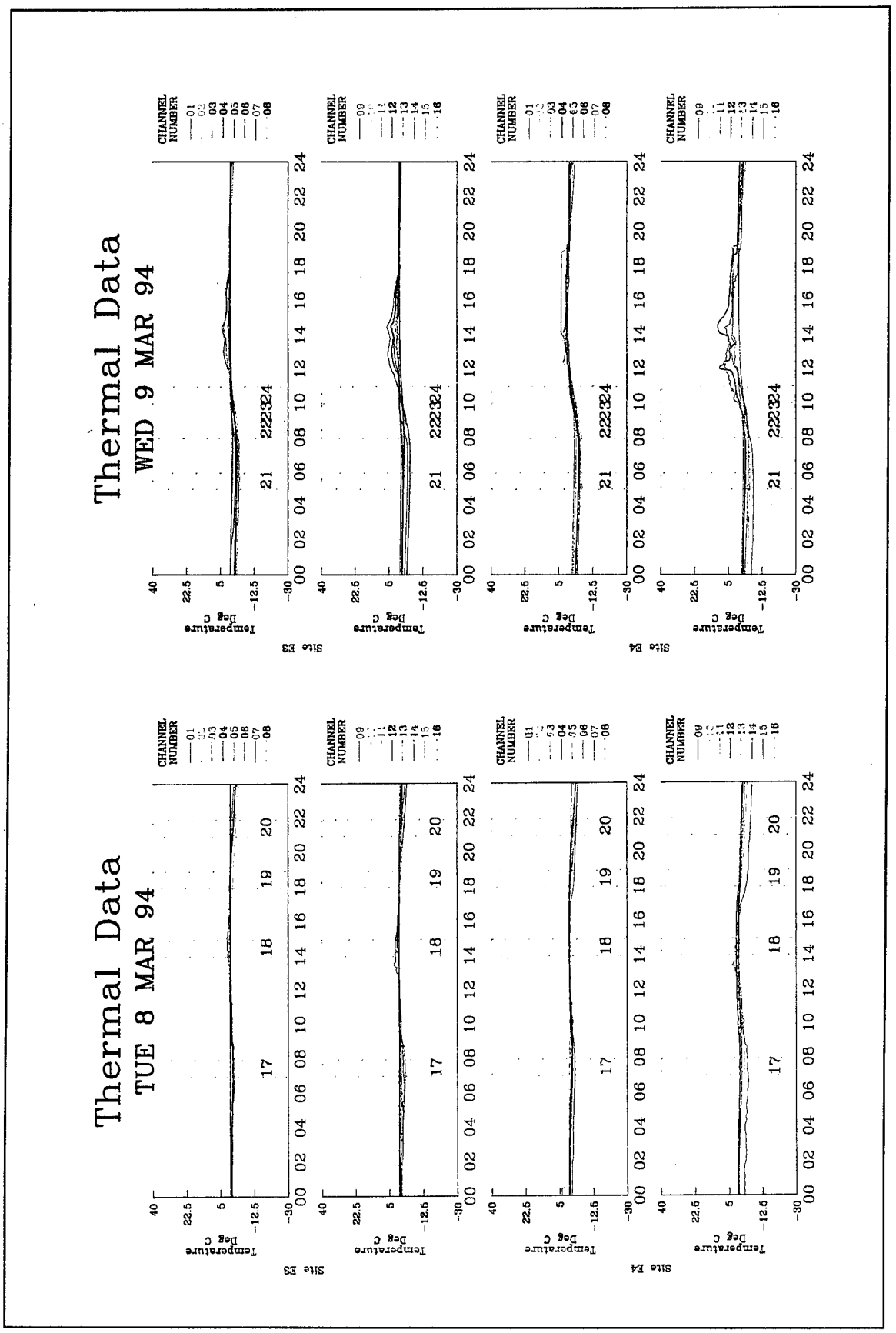
Thermal Data
SUN 6 MAR 94
CHANNEL NUMBER
Temperature Deg C
Site E3
Site E4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WED 9 MAR 94
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Temperature Deg C
Site E3
Site E4
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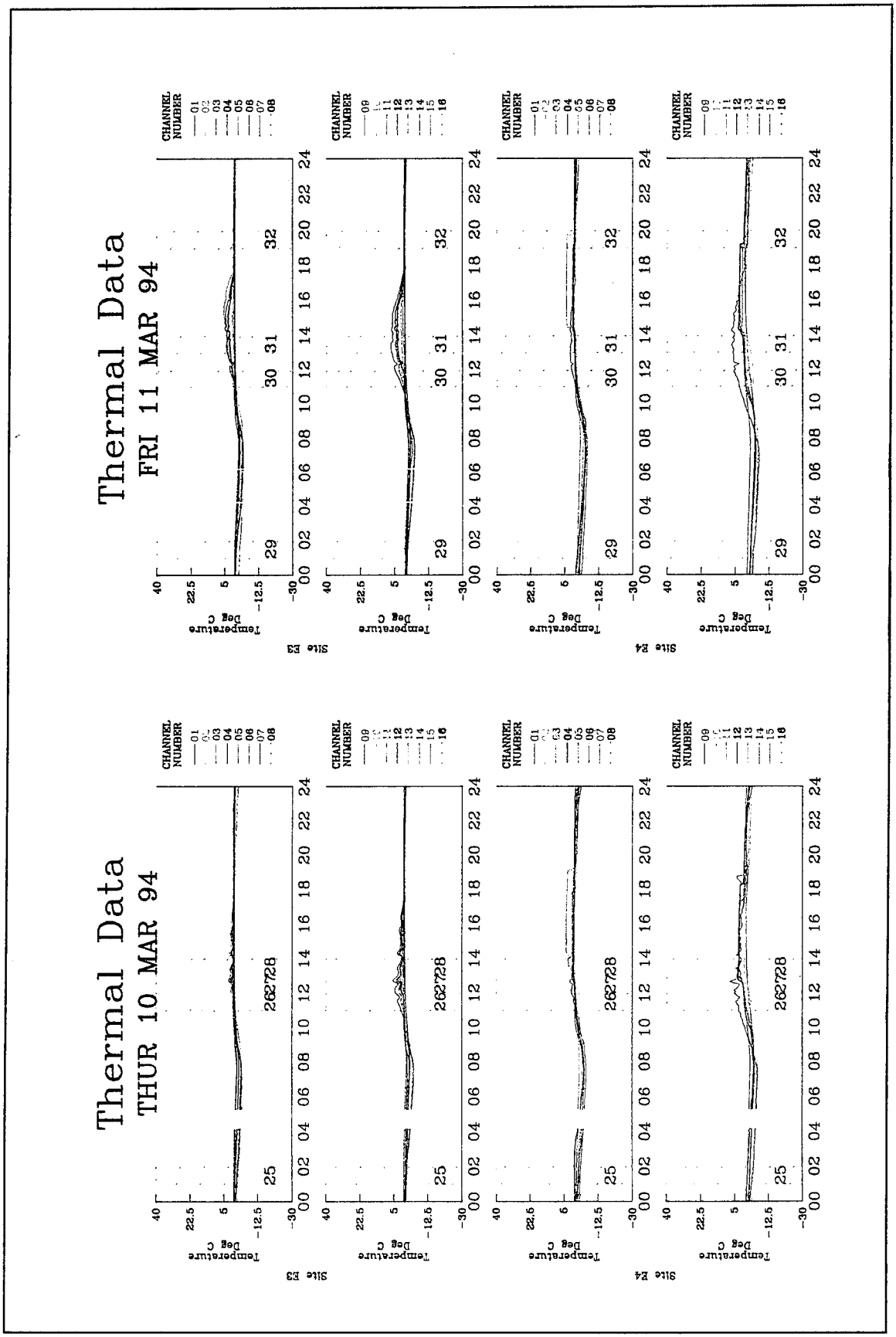
17 18 19 20
21 22 23 24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Thermal Data
THUR 10 MAR 94
CHANNEL NUMBER
Temperature Deg C
Site E3
Site E4
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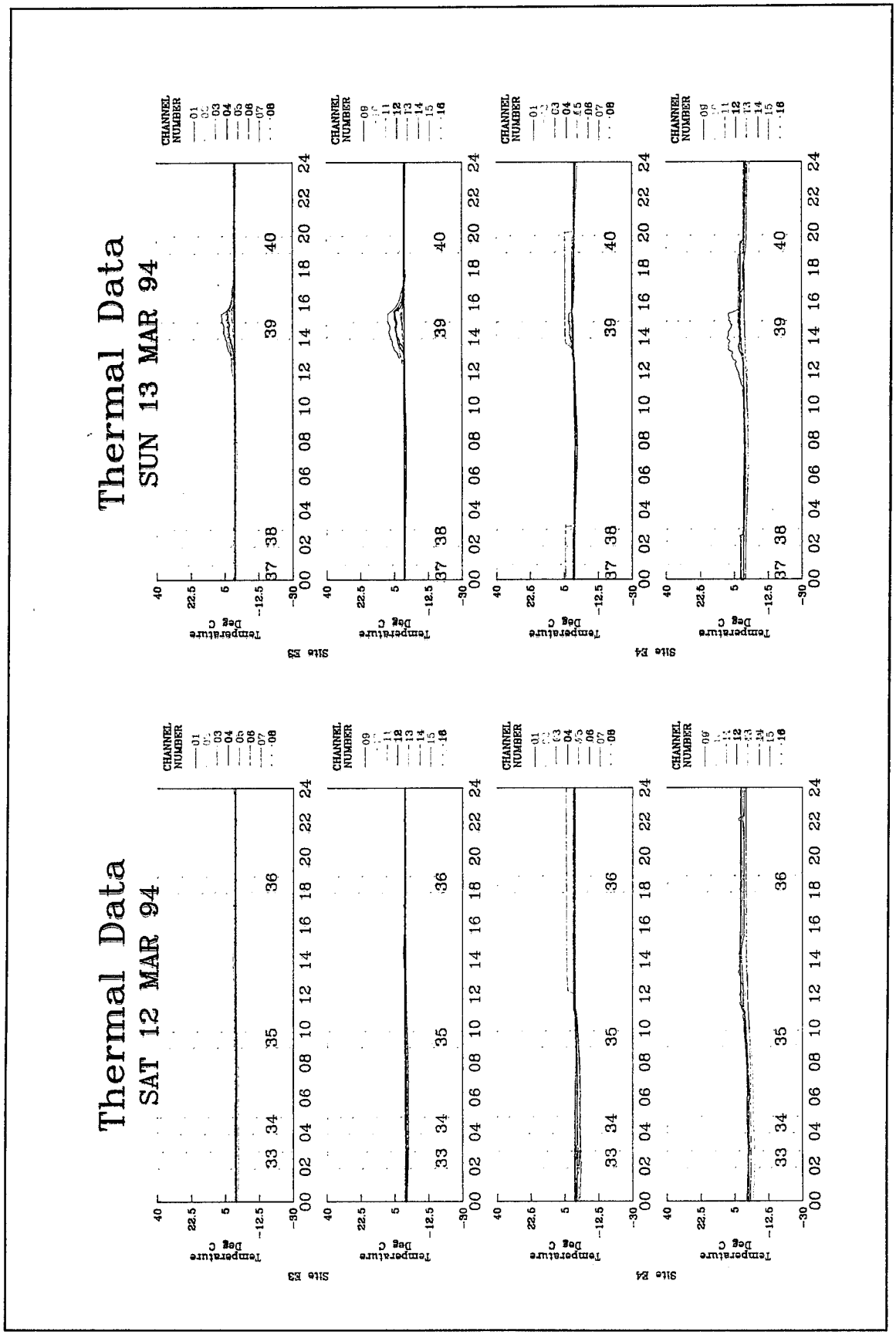
30
31
32
25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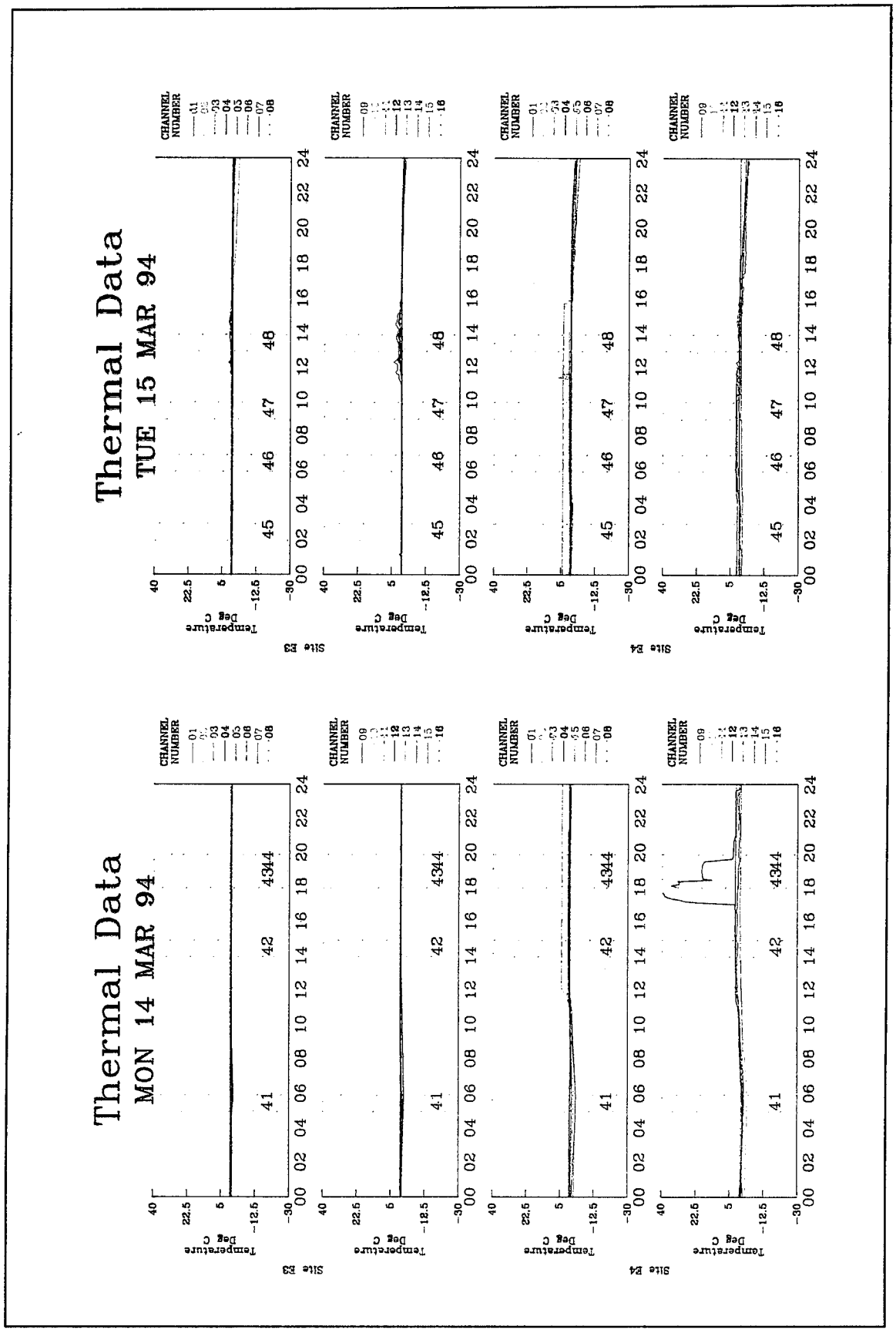
Thermal Data
SAT 12 MAR 94
CHANNEL NUMBER
Temperature Deg C
Site E3
Site E4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MON 14 MAR 94
Thermal Data
TUE 15 MAR 94
Site E3
Site E4
Temperature Deg C
CHANNEL NUMBER
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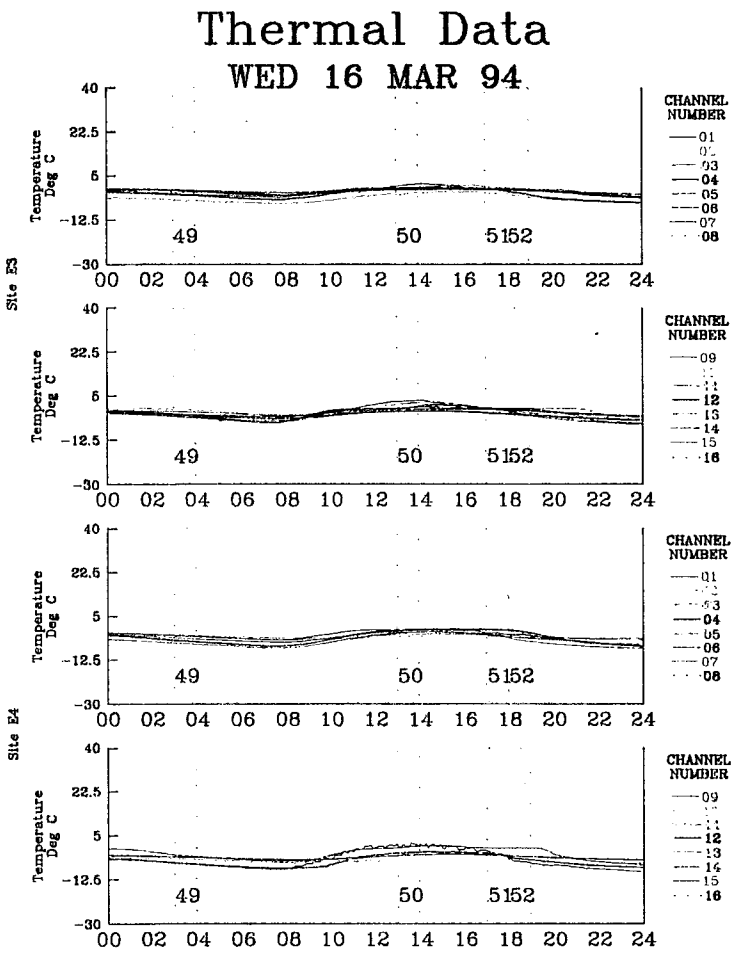
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Site E4
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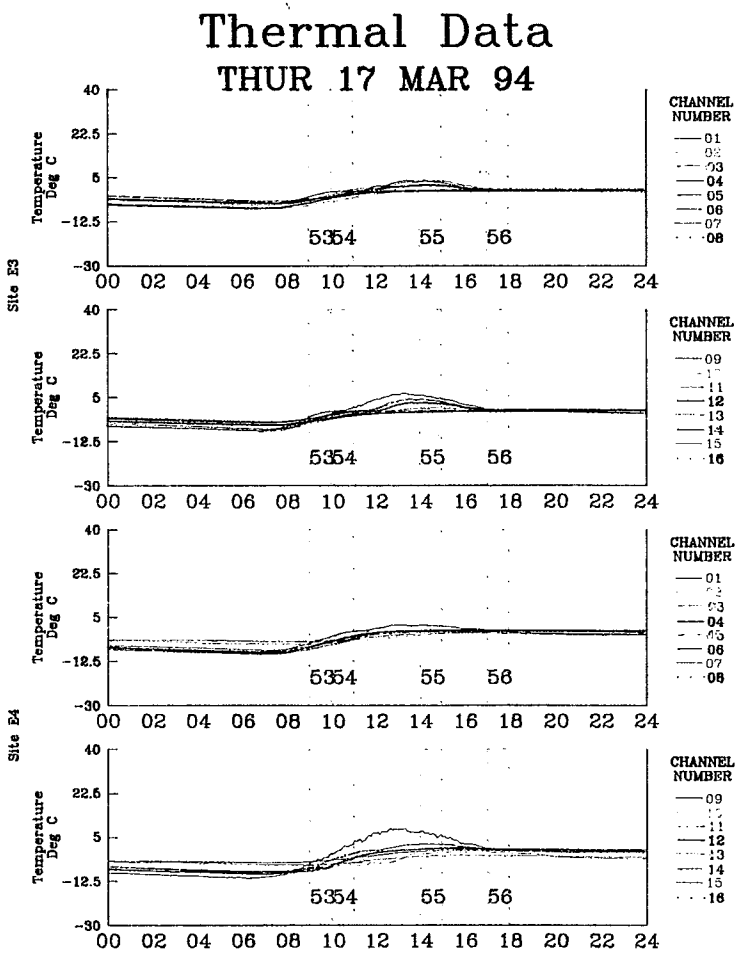
Thermal Data
THUR 17 MAR 94
Site E3
Site E4
Temperature Deg C
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-12.5
-30
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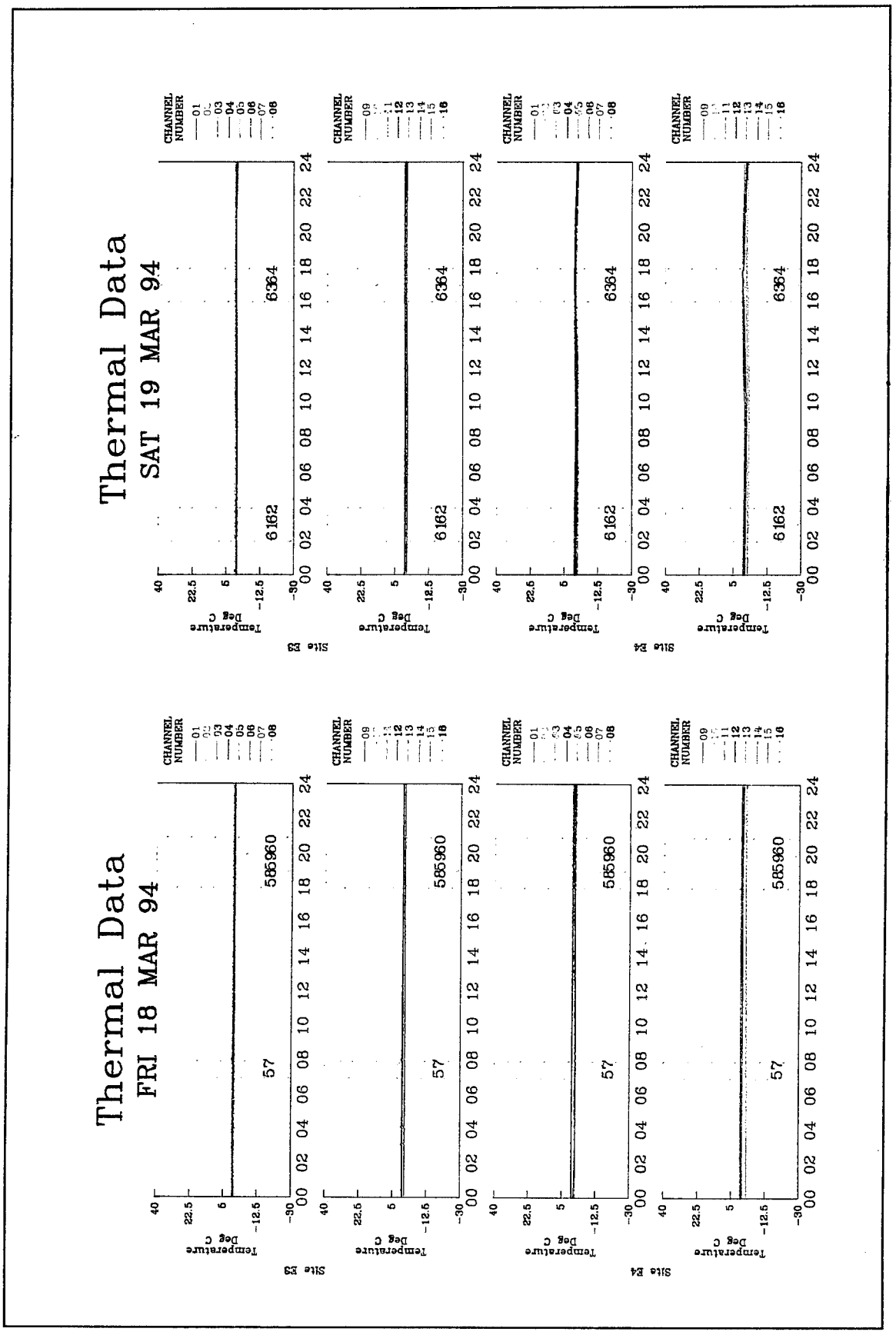
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Thermal Data
FRI 18 MAR 94
Site E3
Site E4
Temperature Deg C
CHANNEL NUMBER
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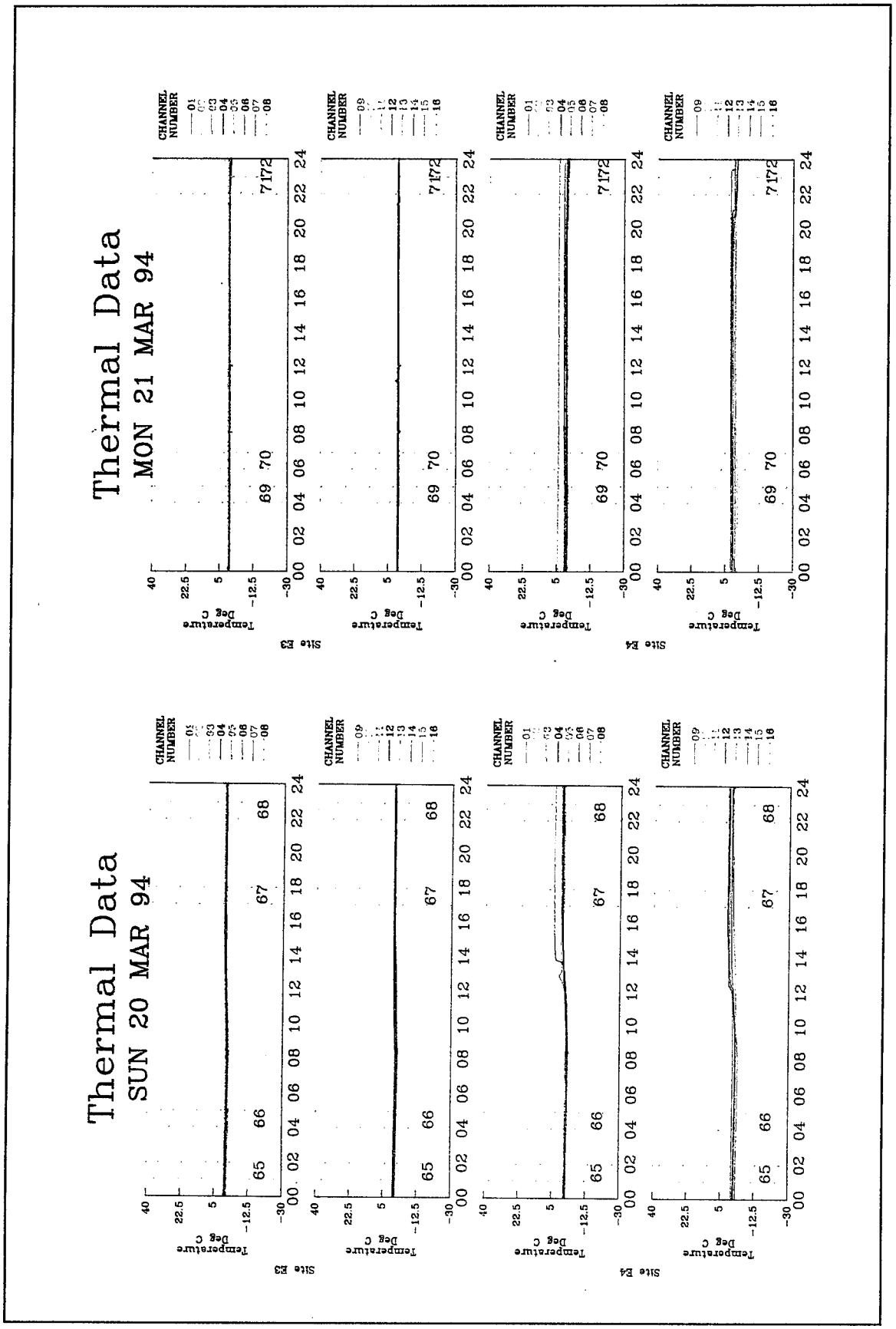
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SUN 20 MAR 94
Thermal Data
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CHANNEL NUMBER
Temperature Deg C
Site E3
Site E4
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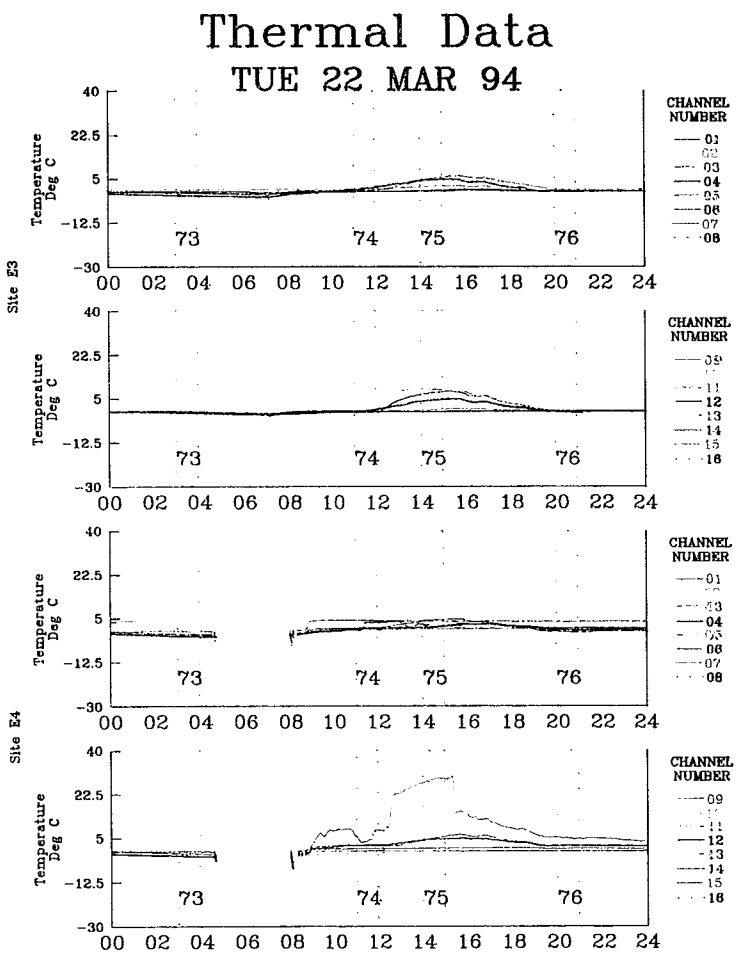
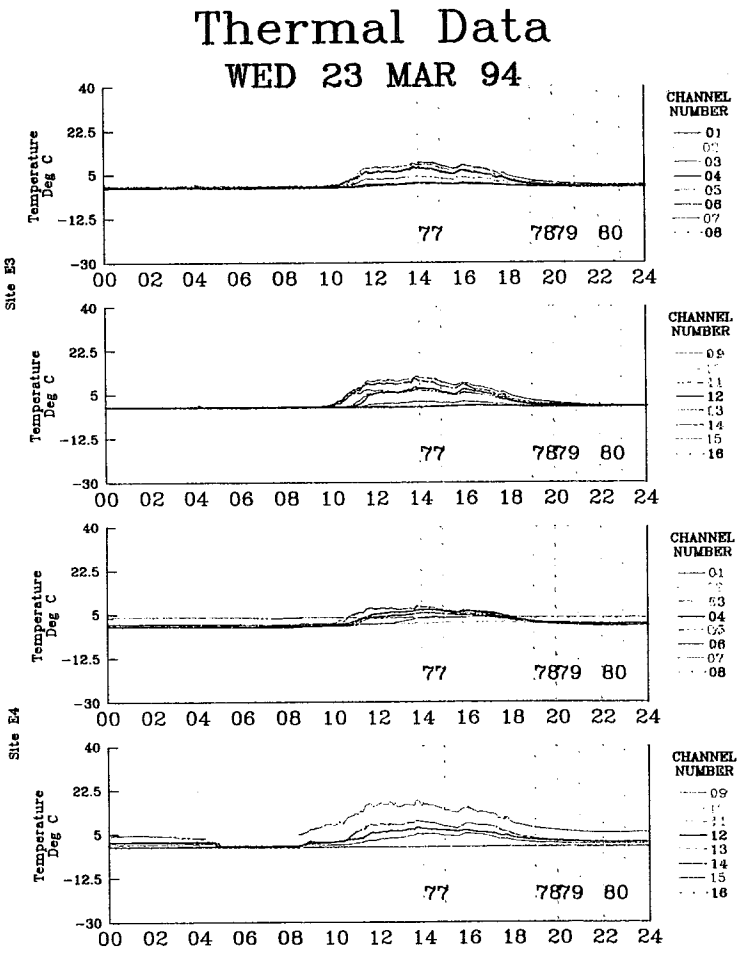
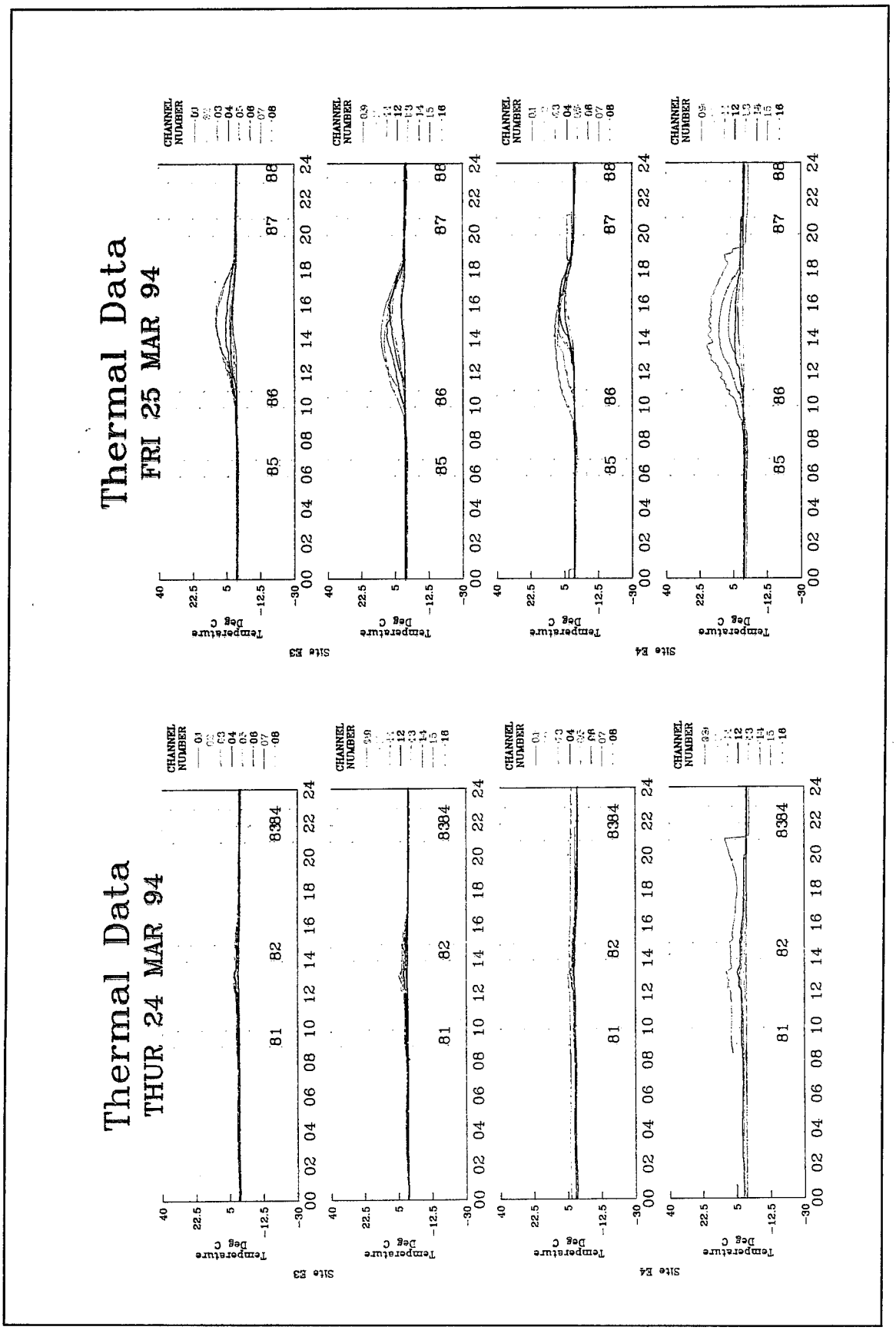
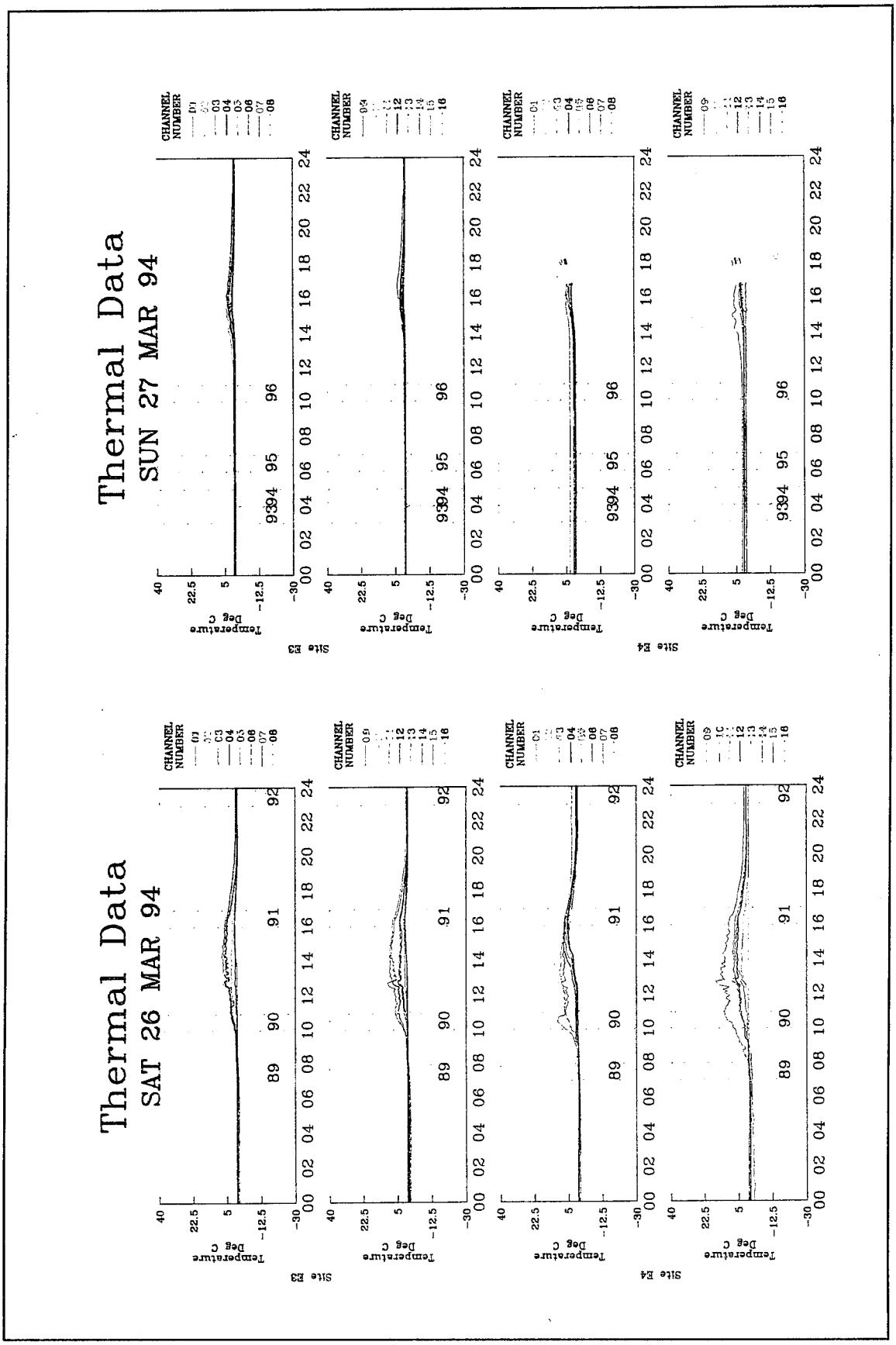
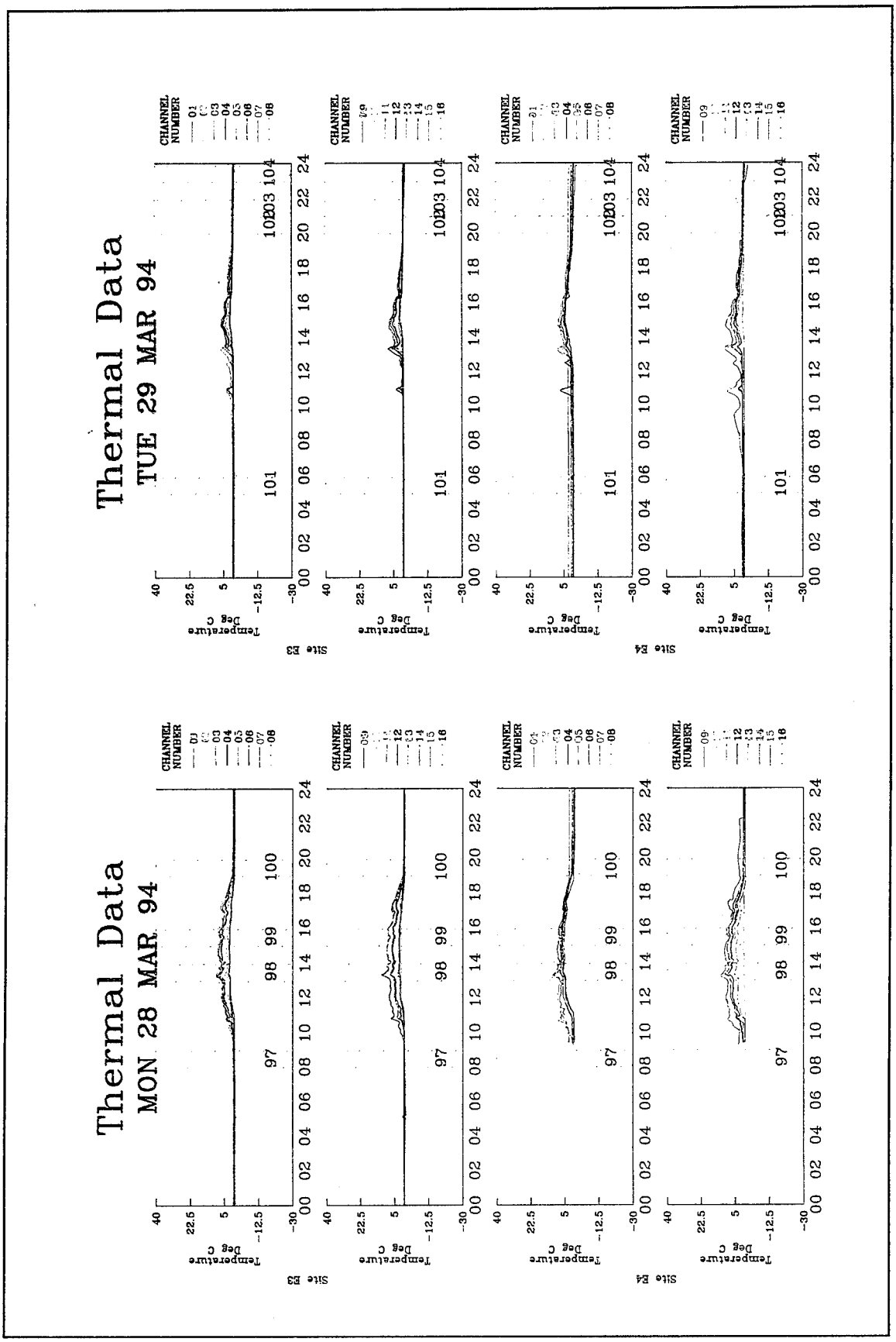
66
67
68
69
70
7172

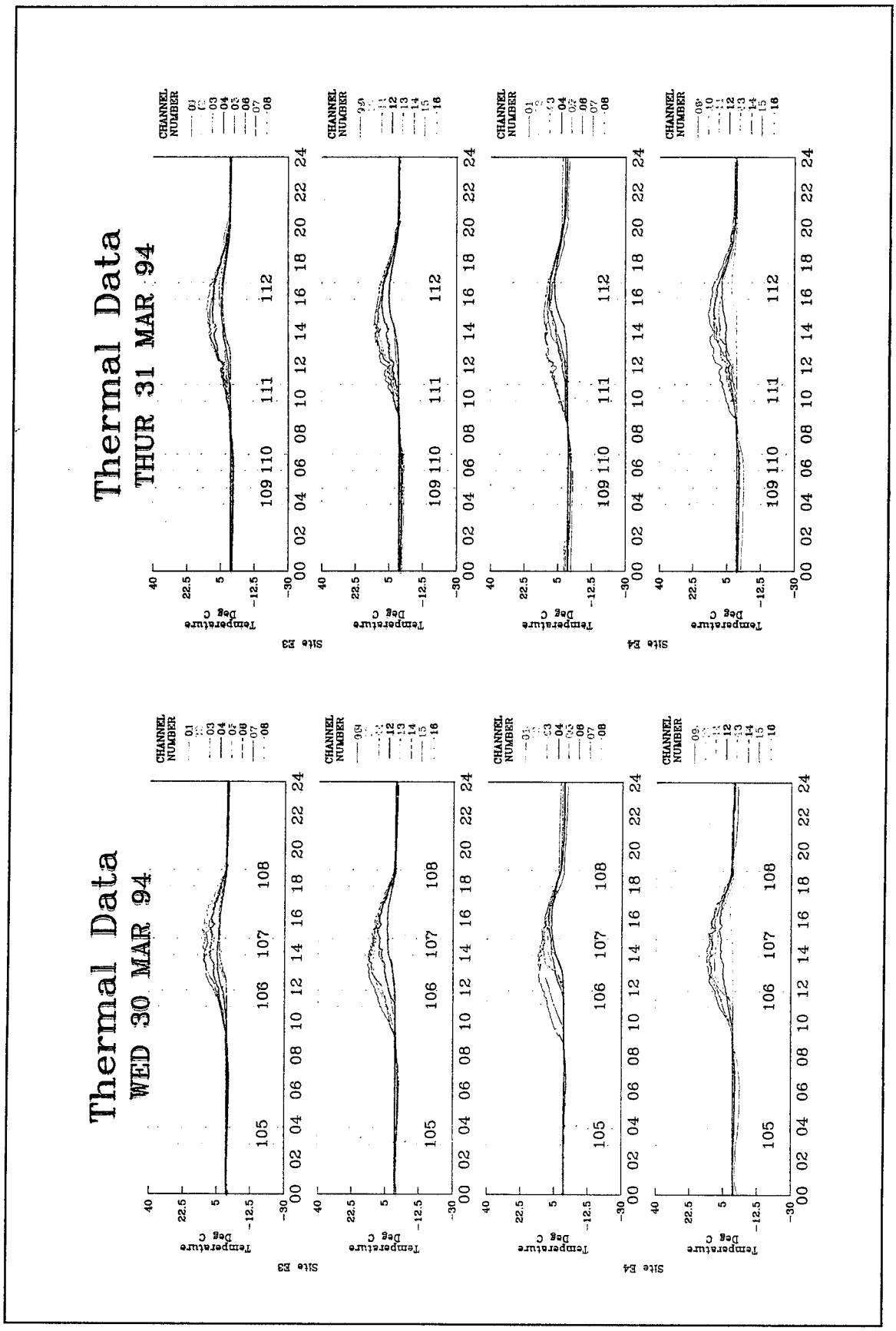

Thermal Data
TUE 22 MAR 94
Site E3
Site E4
Temperature Deg C
CHANNEL NUMBER
01
03
04
05
06
07
08
09
11
12
13
14
15
16
73
74
75
76
00 02 04 06 08 10 12 14 16 18 20 22 24

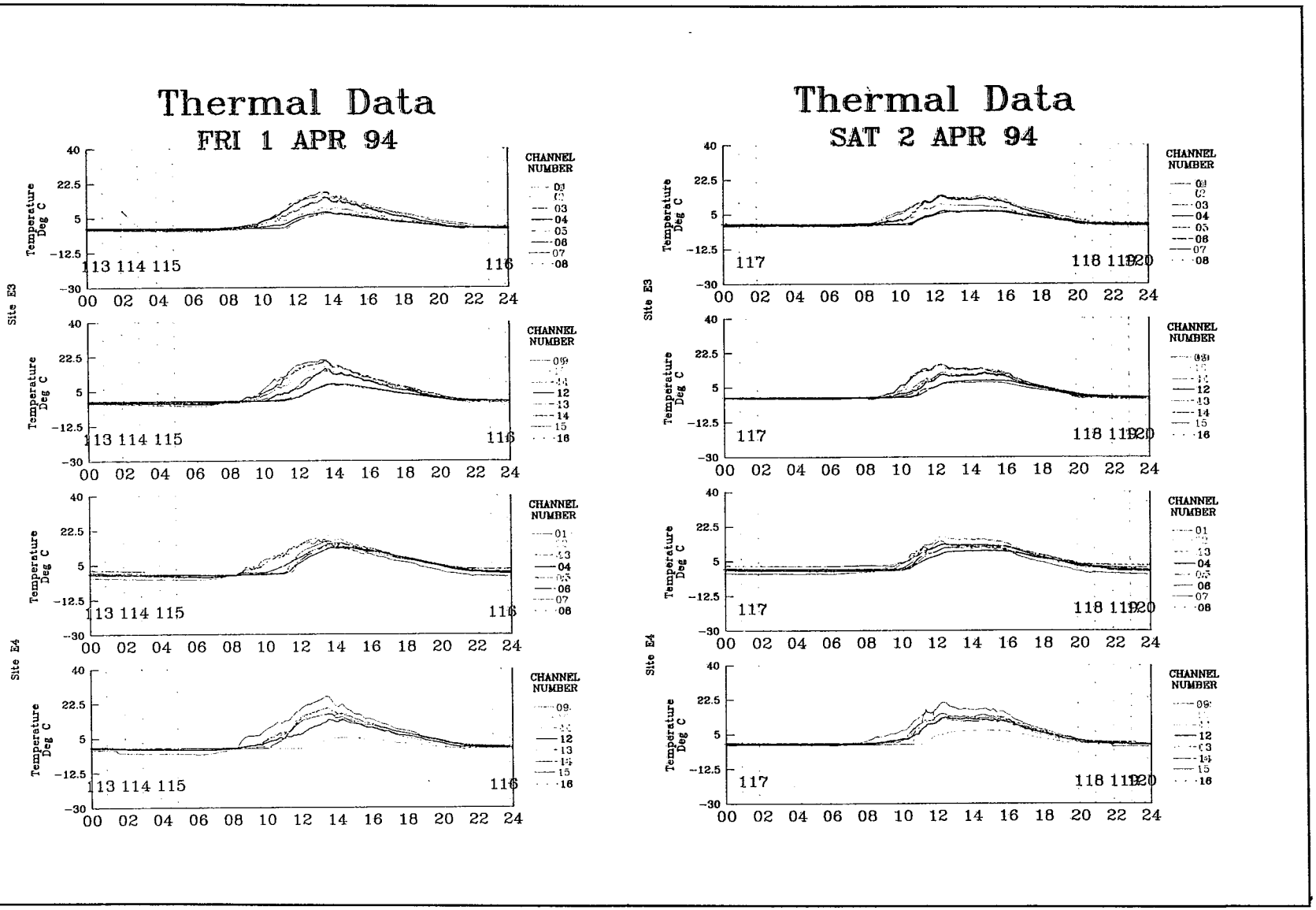

Thermal Data
WED 23 MAR 94
Site E3
Site E4
Temperature Deg C
CHANNEL NUMBER
01
03
04
05
06
07
08
09
11
12
13
14
15
16
77
7879
80
00 02 04 06 08 10 12 14 16 18 20 22 24

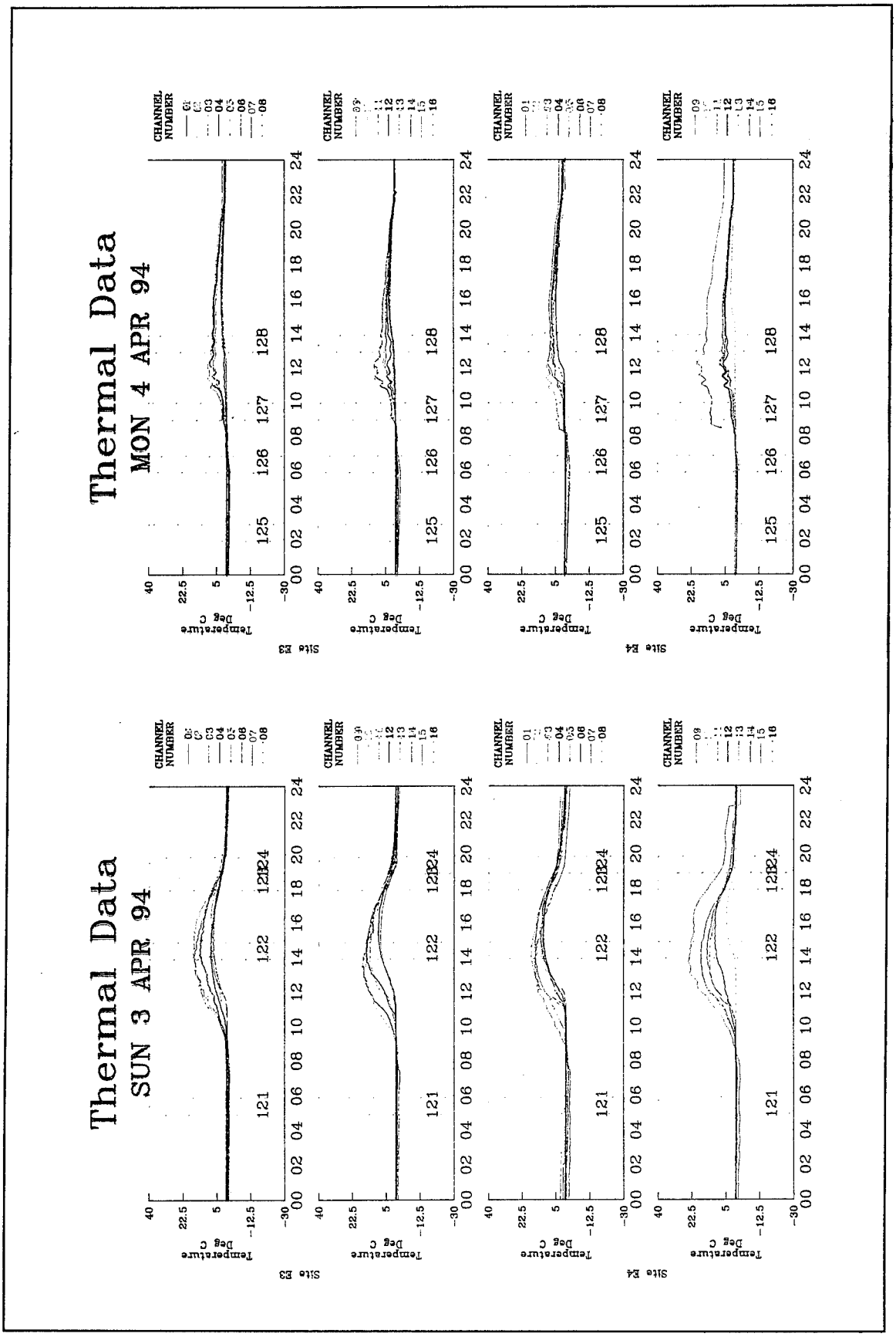

Thermal Data
FRI 25 MAR 94
Thermal Data
THUR 24 MAR 94
Site E3
Site E4
Temperature Deg C
CHANNEL NUMBER
00 02 04 06 08 10 12 14 16 18 20 22 24
85 86 87 88
81 82 8384

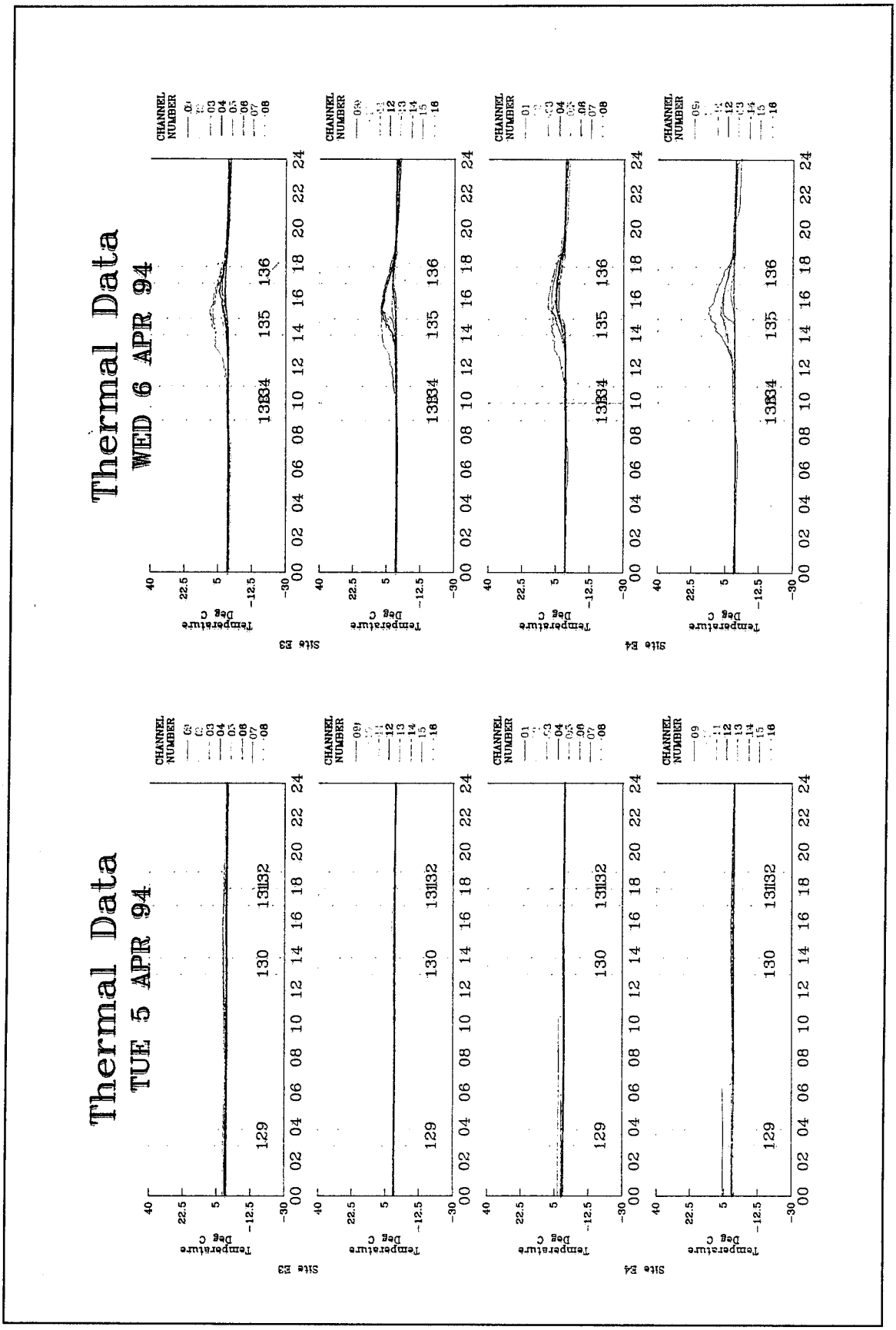

Thermal Data
SUN 27 MAR 94
Thermal Data
SAT 26 MAR 94
CHANNEL NUMBER
Temperature Deg C
Site E3
Site E4

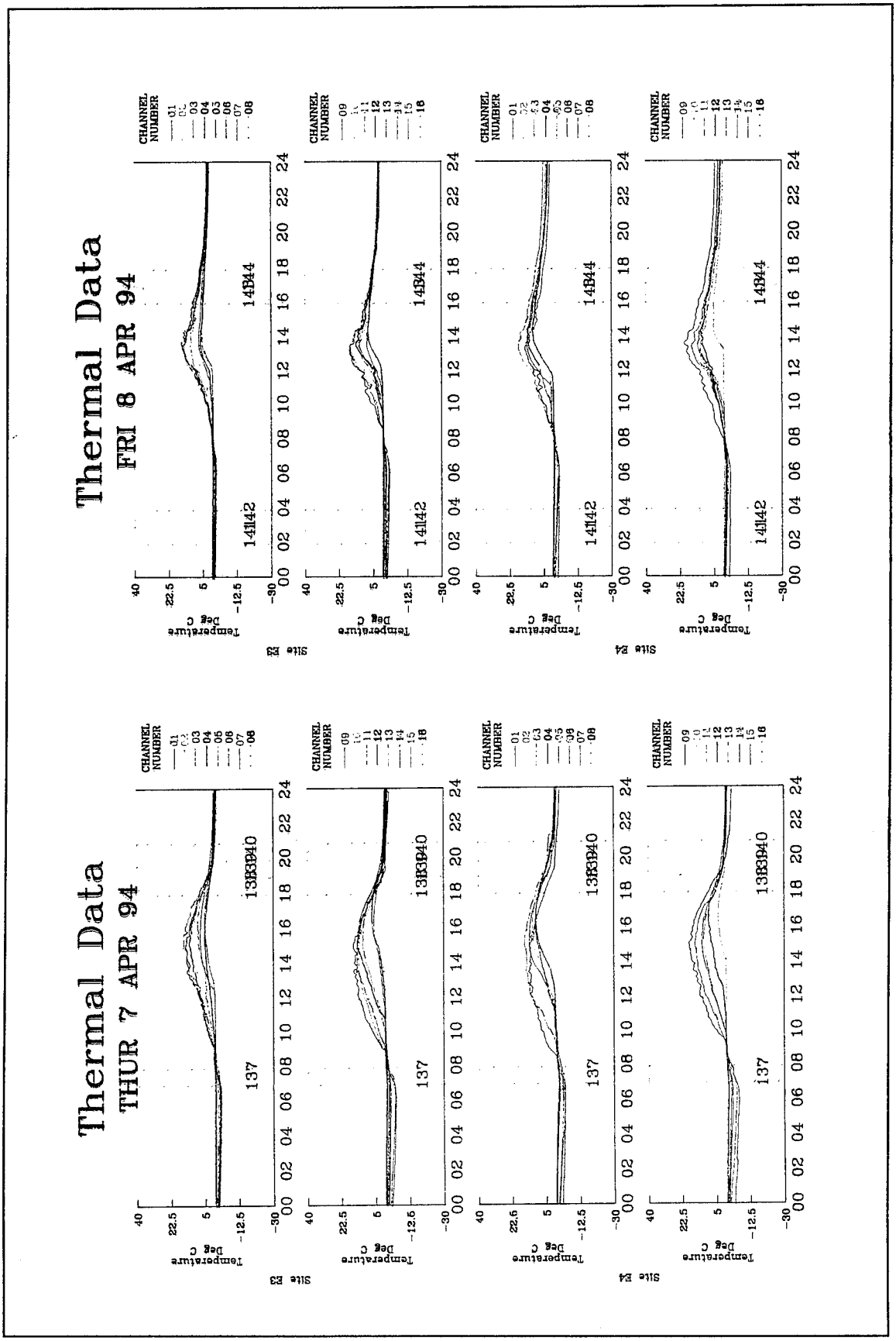

Thermal Data
MON 28 MAR 94
Thermal Data
TUE 29 MAR 94
Site E3
Site E4
Temperature Deg C
CHANNEL NUMBER
01
02
03
04
05
06
07
08
09
10
11
12
13
14
15
16
97
98
99
100
101
102
103
104
00 02 04 06 08 10 12 14 16 18 20 22 24
40
22.5
5
-12.5
-30

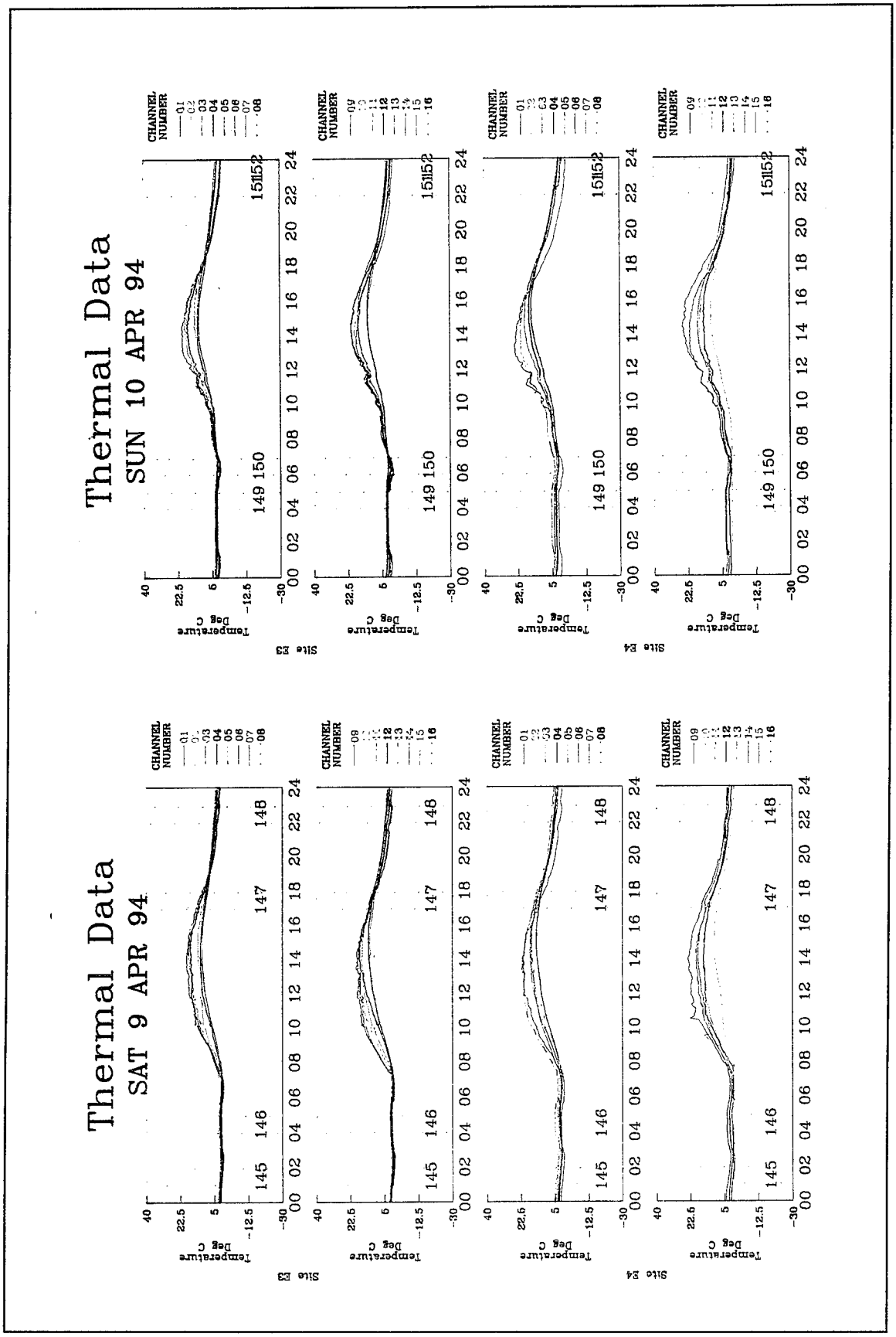

Thermal Data
WED 30 MAR 94
Thermal Data
THUR 31 MAR 94
Site E3
Site E4
Temperature Deg C
CHANNEL NUMBER
01
02
03
04
05
06
07
08
09
10
11
12
13
14
15
16
105
106
107
108
109
110
111
112
00 02 04 06 08 10 12 14 16 18 20 22 24
40
22.5
5
-12.5
-30

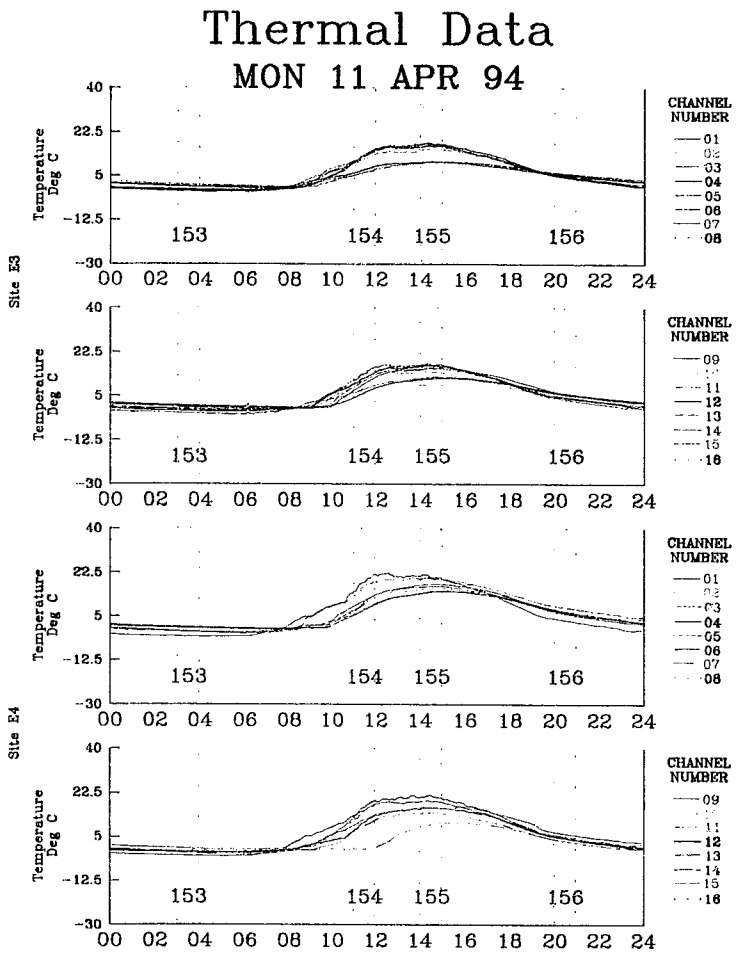

Thermal Data
FRI 1 APR 94
Site E3
Site E4
Temperature Deg C
CHANNEL NUMBER
113 114 115
116
00 02 04 06 08 10 12 14 16 18 20 22 24
Thermal Data
SAT 2 APR 94
117
118 119 120

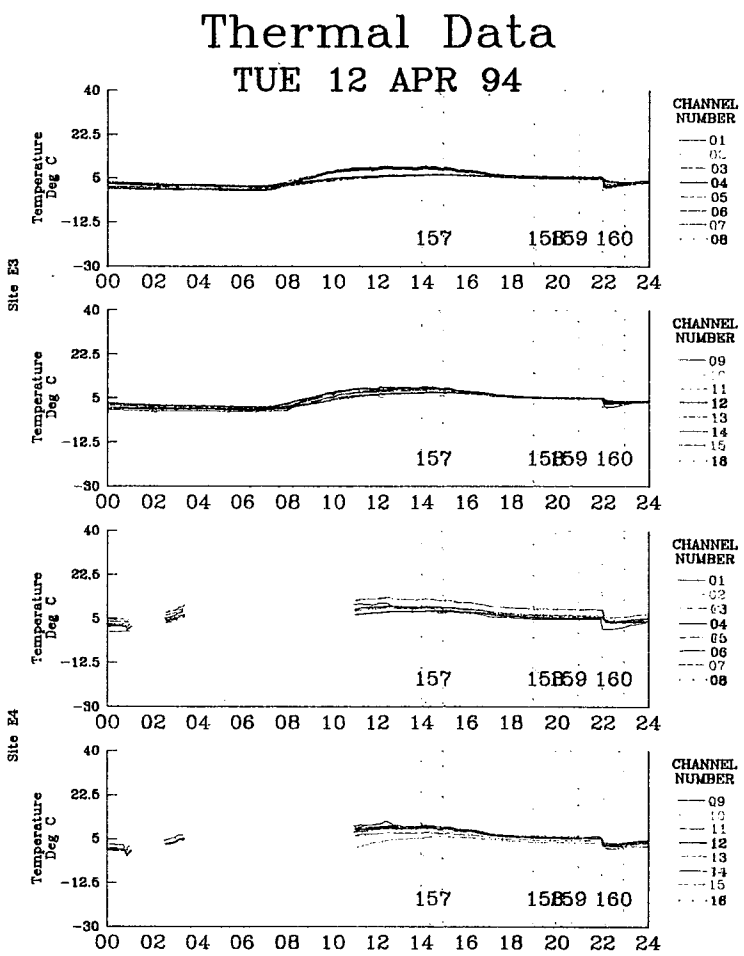

Thermal Data
SUN 3 APR 94
Thermal Data
MON 4 APR 94
Site E3
Site E4
Temperature Deg C
CHANNEL NUMBER
01
02
03
04
05
06
07
08
09
10
11
12
13
14
15
16
121
122
123
124
125
126
127
128
00 02 04 06 08 10 12 14 16 18 20 22 24
40
22.5
5
-12.5
-30

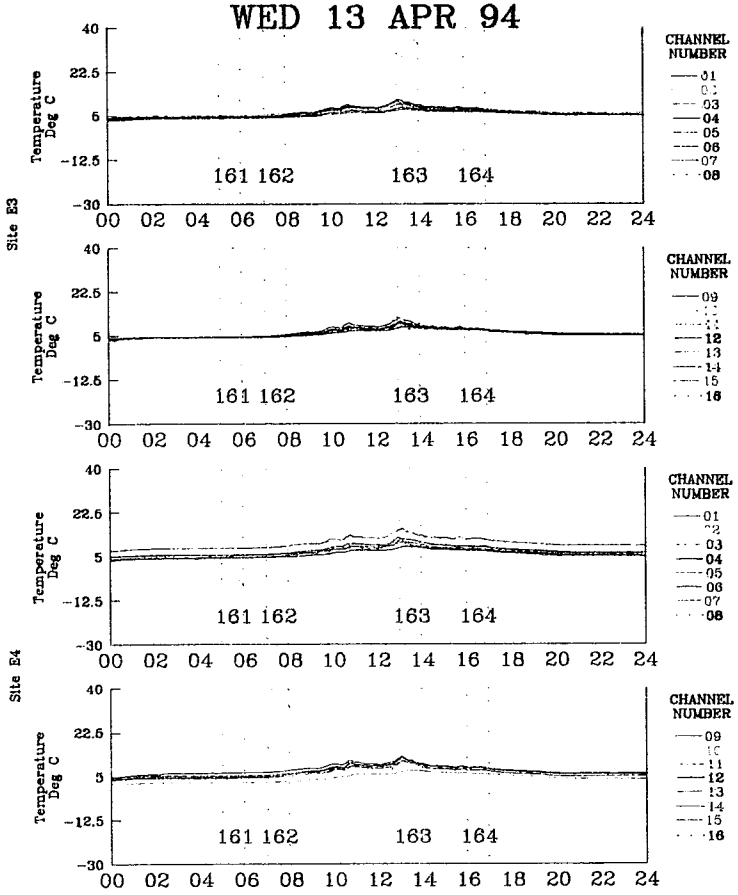

Thermal Data
TUE 5 APR 94
Thermal Data
WED 6 APR 94
Site E3
Site E4
Temperature Deg C
CHANNEL NUMBER
01
02
03
04
05
06
07
08
09
11
12
13
14
15
16
129
130
131
132
134
135
136
00 02 04 06 08 10 12 14 16 18 20 22 24
40
22.5
5
-12.5
-30

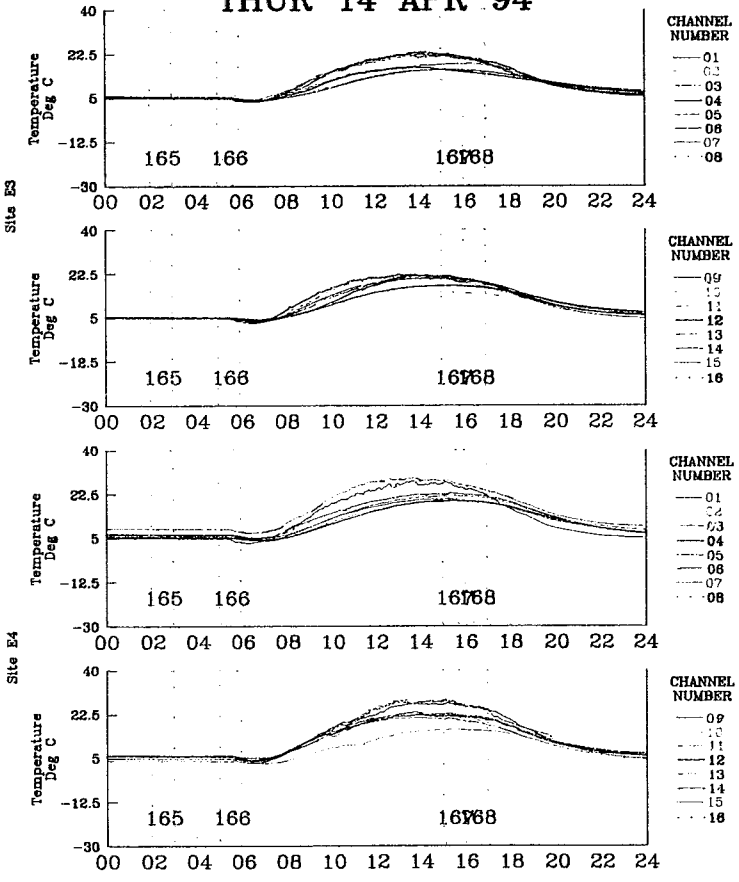

Thermal Data
FRI 8 APR 94
Thermal Data
THUR 7 APR 94
CHANNEL NUMBER
Temperature Deg C
Site E3
Site E4

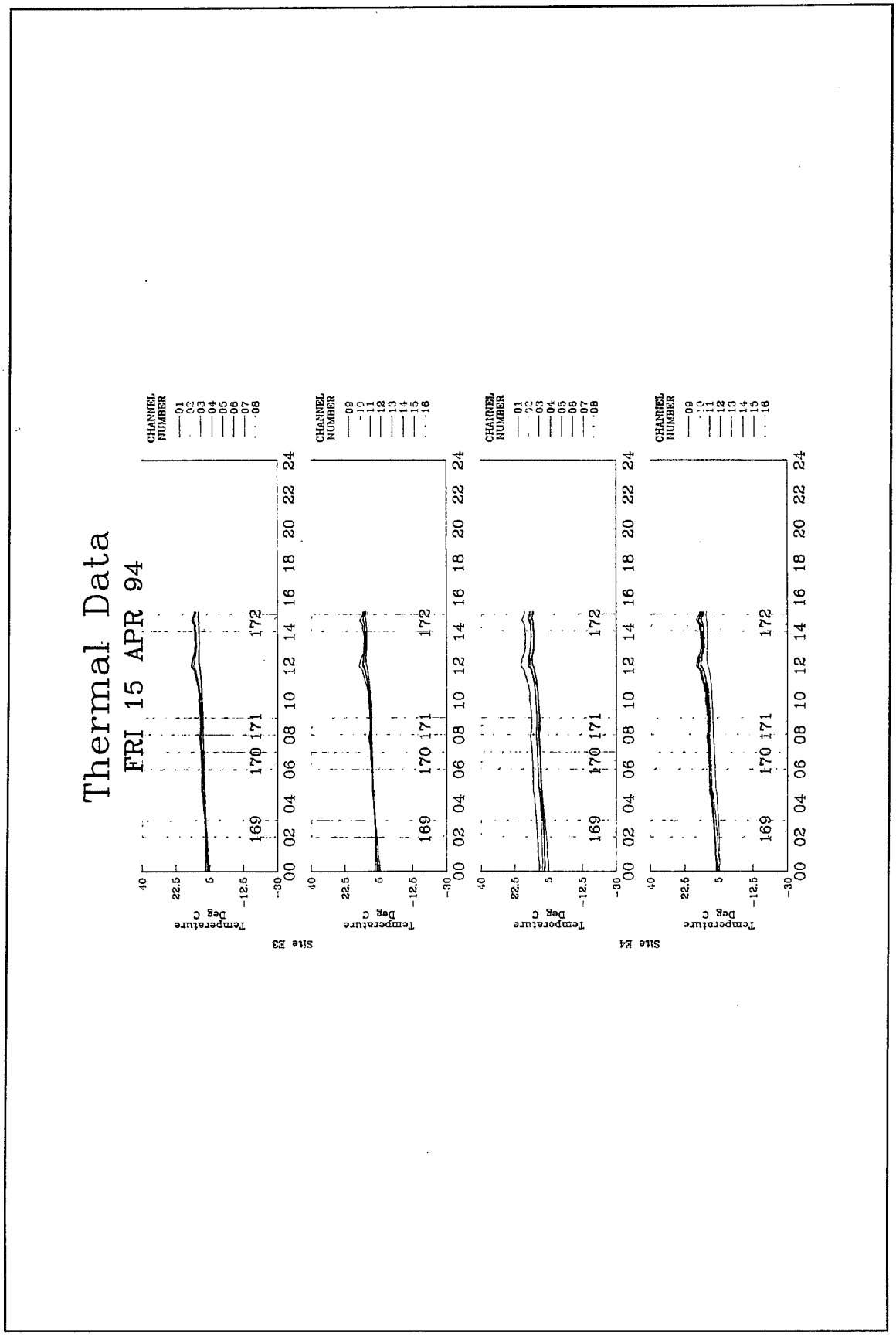

Thermal Data
SUN 10 APR 94
Thermal Data
SAT 9 APR 94
CHANNEL NUMBER
Temperature Deg C
Site E3
Site E4
149 150
145 146
147 148
151152
00 02 04 06 08 10 12 14 16 18 20 22 24


Thermal Data
MON 11 APR 94
Site E3
Site E4
Temperature Deg C
40
22.5
5
-12.5
-30
153
154
155
156
00 02 04 06 08 10 12 14 16 18 20 22 24
CHANNEL NUMBER
01
02
03
04
05
06
07
08
09
10
11
12
13
14
15
16


Thermal Data
TUE 12 APR 94
Site E3
Site E4
Temperature Deg C
40
22.5
5
-12.5
-30
157
158
159
160
00 02 04 06 08 10 12 14 16 18 20 22 24
CHANNEL NUMBER
01
02
03
04
05
06
07
08
09
10
11
12
13
14
15
16


Thermal Data
WED 13 APR 94
Site E3
Site E4
Temperature Deg C
CHANNEL NUMBER
161 162 163 164
00 02 04 06 08 10 12 14 16 18 20 22 24


Thermal Data
THUR 14 APR 94
Site E3
Site E4
Temperature Deg C
CHANNEL NUMBER
165 166 167 168
00 02 04 06 08 10 12 14 16 18 20 22 24


Thermal Data
FRI 15 APR 94
CHANNEL NUMBER
01
02
03
04
05
06
07
08
09
10
11
12
13
14
15
16
Temperature Deg C
40
22.5
5
-12.5
-30
00 02 04 06 08 10 12 14 16 18 20 22 24
169 170 171 172
Site B3
Site B4

Appendix E
Soil Moisture Data

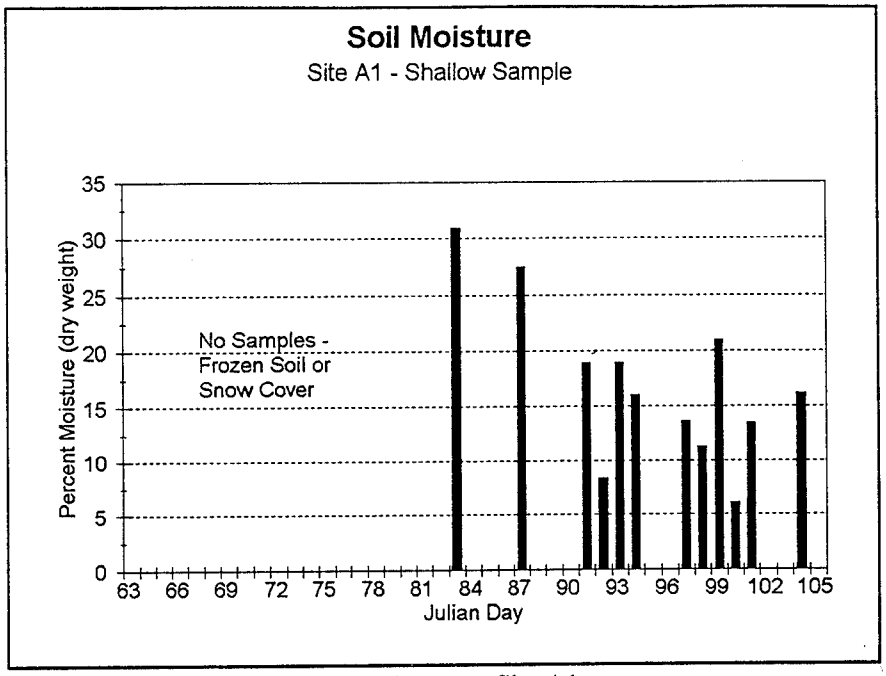


Figure E-1. 1-2 cm depth soil moisture at Site A1

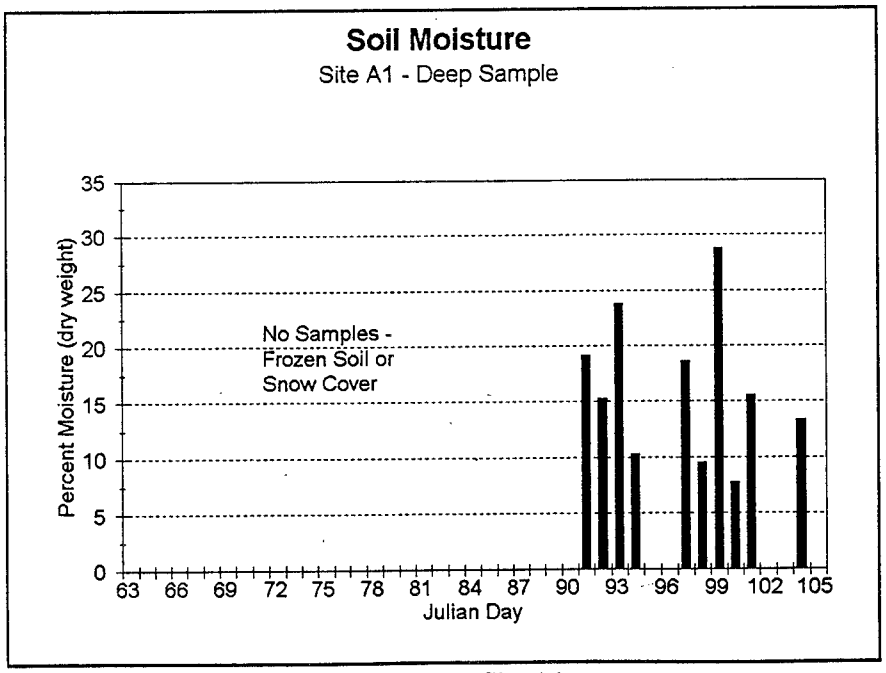


Figure E-2. 3-7cm depth soil moisture at Site A1

SOIL MOISTURE MEASUREMENTS SITE A1										
MOISTURE SAMPLE POSITION DISTANCE FROM ORIGIN STAKE RIGHT SIDE OF LINE										
JULIAN	NUMBER	RAIN ALTERNATE	TIME	PERCENT	CAN	CAN	WET	24 HOUR	48 HOUR	COMMENT
DAY	OF PACES	NUM. OF PACES		MOISTURE	NUMBER	WEIGHT	WEIGHT	WEIGHT	WEIGHT	
63S										
63D										
64S										
64D										
65S										
65D										
66S										
66D										
67S										
67D										
68S										
68D										
69S										
69D										
70S	33	29								

SOIL MOISTURE MEASUREMENTS SITE A1

MOISTURE SAMPLE POSITION DISTANCE FROM ORIGIN STAKE RIGHT SIDE OF LINE

JULIAN DAY	NUMBER OF PACES	RAIN ALTERNATE NUM. OF PACES	TIME	PERCENT MOISTURE	CAN NUMBER	CAN WEIGHT	WET WEIGHT	24 HOUR WEIGHT	48 HOUR WEIGHT	COMMENT
70D	33	29								
71S	31	39								
71D	31	39								
72S	17	47								
72D	17	47								
73S	21	18								
73D	21	18								
74S	22	12								
74D	22	12								
75S	25	26								
75D	25	26								
76S	2	30								
76D	2	30								
77S	42	29								
77D	42	29								

SOIL MOISTURE MEASUREMENTS SITE A1										
MOISTURE SAMPLE POSITION DISTANCE FROM ORIGIN STAKE RIGHT SIDE OF LINE										
JULIAN DAY	NUMBER OF PACES	RAIN ALTERNATE NUM. OF PACES	TIME	PERCENT MOISTURE	CAN NUMBER	CAN WEIGHT	WET WEIGHT	24 HOUR WEIGHT	48 HOUR WEIGHT	COMMENT
78S	24	2								
78D	24	2								
79S	40	5								
79D	40	5								
80S	9	20								
80D	9	20								
81S	1	40								
81D	1	40								
82S	4	30								
82D	4	30								
83S	18	27	10:50	30.898	1	65.80	395.40	337.90	317.60	
83D	18	27								SNOW
84S	10	17								
84D	10	17								
85S	16	18								

SOIL MOISTURE MEASUREMENTS SITE A1										
MOISTURE SAMPLE POSITION DISTANCE FROM ORIGIN STAKE RIGHT SIDE OF LINE										
JULIAN DAY	NUMBER OF PACES	RAIN ALTERNATE NUM. OF PACES	TIME	PERCENT MOISTURE	CAN NUMBER	CAN WEIGHT	WET WEIGHT	24 HOUR WEIGHT	48 HOUR WEIGHT	COMMENT
85D	16	18								
86S	27	46								
86D	27	46								
87S	16	8	14:40	27.511	2	63.30	302.00	236.90	250.50	
87D	16	8								FROZEN GROUND
88S	1	5								STANDING WATER
88D	1	5								
89S	24	13								FROZEN GROUND
89D	24	13								
90S	24	3								FROZEN GROUND
90D	24	3								
91S	26	26	15:00	18.928	5	65.20	357.24	309.60	310.76	
91D	26	26	15:00	19.238	1	63.30	490.97	421.34	421.97	
92S	9	19	15:00	8.407	13	65.70	296.53	278.69	278.63	
92D	9	19	15:00	15.286	24	63.80	531.39	469.64	469.39	

SOIL MOISTURE MEASUREMENTS SITE A1										
MOISTURE SAMPLE POSITION DISTANCE FROM ORIGIN STAKE RIGHT SIDE OF LINE										
JULIAN DAY	NUMBER OF PACES	RAIN ALTERNATE NUM. OF PACES	TIME	PERCENT MOISTURE	CAN NUMBER	CAN WEIGHT	WET WEIGHT	24 HOUR WEIGHT	48 HOUR WEIGHT	COMMENT
93S	43	27	13:48	18.921	15	63.90	414.24	361.33	358.50	
93D	43	27	13:48	23.779	308	63.40	244.86	212.60	210.00	Sample Small/frozen ground
94S	39	43	12:40	16.012	3	62.70	447.86	397.00	394.70	
94D	39	43	12:40	10.284	22	65.00	565.69	520.80	519.00	
95S	47	32								SNOW
95D	47	32								
96S	31	10								FROZEN GROUND
96D	31	10								
97S	11	28	14:55	13.663	12	63.40	449.40	403.00	403.00	
97D	11	28	14:55	18.634	17	63.80	447.70	387.60	387.40	
98S	18	18	15:20	11.272	5	65.20	419.60	383.70	383.70	
98D	18	18	15:20	9.559	21	63.60	503.70	465.30	465.30	
99S	30	18	16:17	20.976	1058	64.70	330.00	284.50	284.00	
99D	30	18	16:17	29.808	1078	63.00	333.00	270.40	271.00	
100S	16	16	15:50	6.091	1	65.80	421.10	400.80	400.70	

SOIL MOISTURE MEASUREMENTS SITE A1										
MOISTURE SAMPLE POSITION DISTANCE FROM ORIGIN STAKE RIGHT SIDE OF LINE										
JULIAN DAY	NUMBER OF PACES	RAIN ALTERNATE NUM. OF PACES	TIME	PERCENT MOISTURE	CAN NUMBER	CAN WEIGHT	WET WEIGHT	24 HOUR WEIGHT	48 HOUR WEIGHT	COMMENT
100D	16	16	15:50	7.805	25	66.00	470.70	441.60	441.40	
101S	33	14	13:29	13.545	49	63.00	466.20	418.60	418.10	
101D	33	14	13:29	15.598	109	63.30	393.10	348.70	348.60	
102S	50	41								RAIN ALL DAY
102D	50	41								
103S	5	19								RAIN ALL DAY
103D	5	19								
104S	14	2	17:33	16.220	11	65.60	338.60	300.50	300.50	
104D	14	2	17:33	11.359	20	63.20	382.80	350.20	350.20	
105S	6	45								NO SAMPLE
105D	6	45								

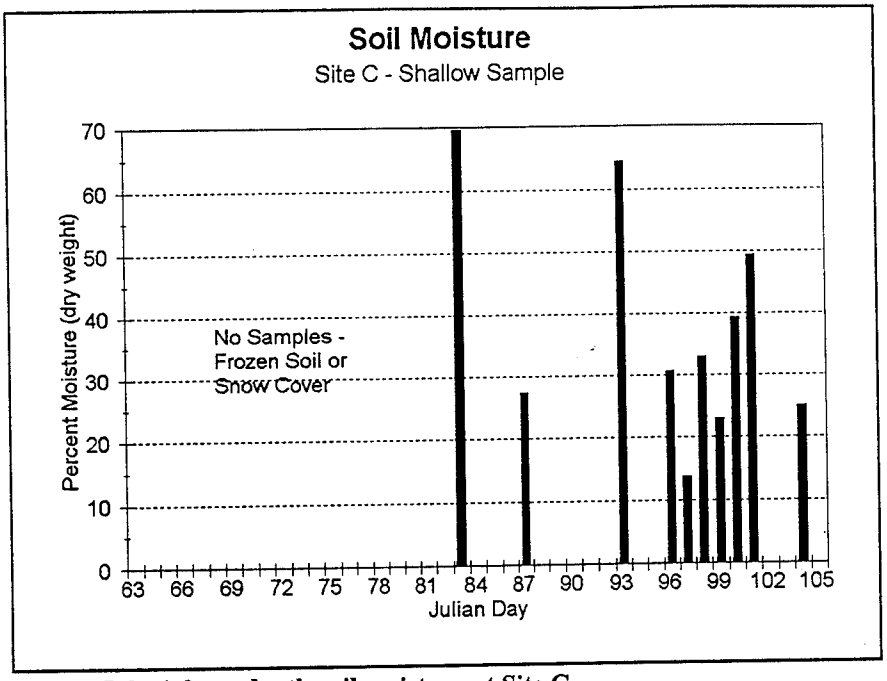


Figure E-3. 1-2 cm depth soil moisture at Site C

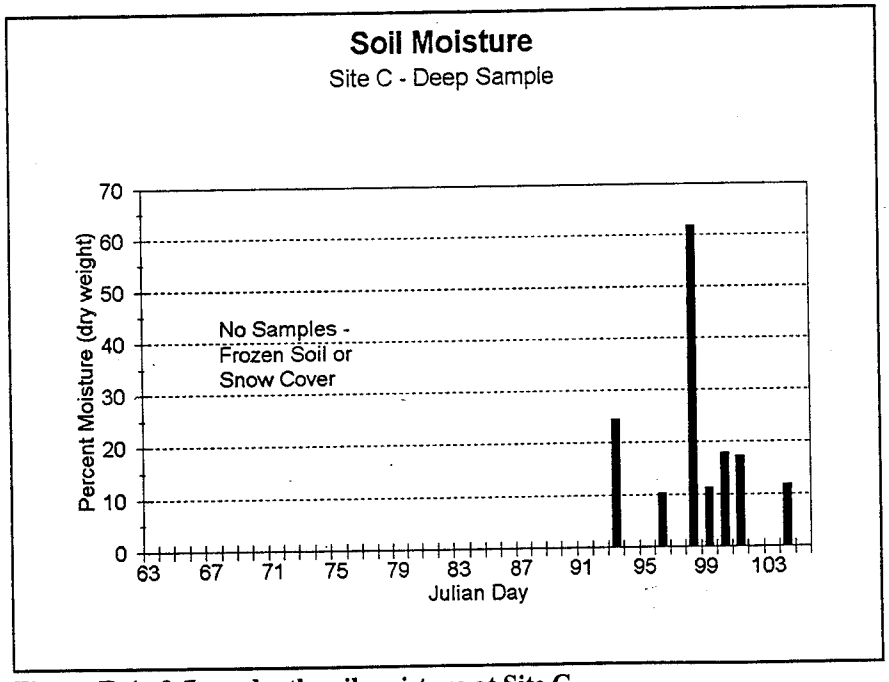


Figure E-4. 3-7 cm depth soil moisture at Site C

SOIL MOISTURE MEASUREMENTS SITE C										
MOISTURE SAMPLE POSITION DISTANCE FROM ORIGIN STAKE RIGHT SIDE OF LINE										
JULIAN DAY	NUMBER OF PACES	RAIN ALTERNATE NUM. OF PACES	TIME	PERCENT MOISTURE	CAN NUMBER	CAN WEIGHT	WET WEIGHT	24 HOUR WEIGHT	48 HOUR WEIGHT	COMMENT
63S	10	48								
63D	10	48								
64S	13	33								
64D	13	33								
65S	10	20								
65D	10	20								
66S	16	49								
66D	16	49								
67S	23	16								
67D	23	16								
68S	42	44								
68D	42	44								
69S	43	39								
69D	43	39								
70S	40	14								
70D	40	14								

SOIL MOISTURE MEASUREMENTS SITE C										
MOISTURE SAMPLE POSITION DISTANCE FROM ORIGIN STAKE RIGHT SIDE OF LINE										
JULIAN	NUMBER	RAIN ALTERNATE	TIME	PERCENT	CAN	CAN	WET	24 HOUR	48 HOUR	COMMENT
DAY	OF PACES	NUM. OF PACES		MOISTURE	NUMBER	WEIGHT	WEIGHT	WEIGHT	WEIGHT	
71S	14	46								
71D	14	46								
72S	47	50								
72D	47	50								
73S	28	4								
73D	28	4								
74S	37	30								
74D	37	30								
75S	48	27								
75D	48	27								
76S	33	8								
76D	33	8								
77S	29	35								
77D	29	35								
78S	20	21								
78D	20	21								

SOIL MOISTURE MEASUREMENTS SITE C										
MOISTURE SAMPLE POSITION DISTANCE FROM ORIGIN STAKE RIGHT SIDE OF LINE										
JULIAN DAY	NUMBER OF PACES	RAIN ALTERNATE NUM. OF PACES	TIME	PERCENT MOISTURE	CAN NUMBER	CAN WEIGHT	WET WEIGHT	24 HOUR WEIGHT	48 HOUR WEIGHT	COMMENT
79S	8	19								
79D	8	19								
80S	44	19								
80D	44	19								
81S	41	18								
81D	41	18								
82S	2	9								
82D	2	9								
83S	6	14	10:35	69.557	1	63.00	239.00	194.80	166.80	
83D	6	14								SNOW
84S	13	2								FROZEN GROUND
84D	13	2								
85S	4	41								SNOW
85D	4	41								
86S	49	18								FROZEN GROUND
86D	49	18								

SOIL MOISTURE MEASUREMENTS SITE C										
MOISTURE SAMPLE POSITION DISTANCE FROM ORIGIN STAKE RIGHT SIDE OF LINE										
JULIAN	NUMBER	RAIN ALTERNATE	TIME	PERCENT	CAN	CAN	WET	24 HOUR	48 HOUR	COMMENT
DAY	OF PACES	NUM. OF PACES		MOISTURE	NUMBER	WEIGHT	WEIGHT	WEIGHT	WEIGHT	
87S	41	3								SNOW
87D	41	3								
88S	26	49								
88D	26	49								
89S	23	25								FROZEN GROUND
89D	23	25								
90S	6	49								FROZEN GROUND
90D	6	49								
91S	33	33								FROZEN GROUND
91D	33	33								
92S	12	17	14:30	216.832	18	64.20	118.60	81.45	81.37	Sample < 100g
92D	12	17								
93S	18	25	13:23	64.369	20	63.20	248.28	248.28	175.80	
93D	18	25	13:23	24.517	1078	63.00	423.85	355.01	352.80	
94S	26	34								FROZEN GROUND

SOIL MOISTURE MEASUREMENTS SITE C										
MOISTURE SAMPLE POSITION DISTANCE FROM ORIGIN STAKE RIGHT SIDE OF LINE										
JULIAN DAY	NUMBER OF PACES	RAIN ALTERNATE NUM. OF PACES	TIME	PERCENT MOISTURE	CAN NUMBER	CAN WEIGHT	WET WEIGHT	24 HOUR WEIGHT	48 HOUR WEIGHT	COMMENT
94D	26	34								
95S	8	4								SNOW
95D	8	4								
96S	43	35	15:33	30.678	11	65.60	331.40	269.40	269.00	
96D	43	35	15:33	10.303	15	63.90	461.10	424.10	424.00	
97S	31	46	14:42	73.709	1	65.85	326.50	216.30	215.90	
97D	31	46								FROZEN GROUND
98S	4	11	15:03	33.033	14	64.40	315.70	253.40	253.30	
98D	4	11	15:03	61.749	22	65.00	436.70	394.80	294.80	
99S	47	2	16:05	22.863	11	65.60	387.50	327.60	327.60	
99D	47	2	16:05	11.238	20	63.20	442.30	404.10	404.00	
100S	7	13	15:36	39.297	17	63.90	289.70	226.00	226.00	
100D	7	13	15:36	17.923	18	64.20	383.30	334.90	334.80	
101S	15	16	13:17	46.499	3	62.70	284.50	214.10	214.10	
101D	15	16	13:17	17.203	14	64.40	373.70	328.40	328.30	

SOIL MOISTURE MEASUREMENTS SITE C

MOISTURE SAMPLE POSITION DISTANCE FROM ORIGIN STAKE RIGHT SIDE OF LINE

JULIAN DAY	NUMBER OF PACES	RAIN ALTERNATE NUM. OF PACES	TIME	PERCENT MOISTURE	CAN NUMBER	CAN WEIGHT	WET WEIGHT	24 HOUR WEIGHT	48 HOUR WEIGHT	COMMENT
102S	22	21								RAIN ALL DAY
102D	22	21								
103S	2	28								RAIN ALL DAY
103D	2	28								
104S	48	46	17:18	24.980	1006	62.70	368.40	307.30	307.30	
104D	48	46	17:18	11.811	1007	65.00	450.30	409.60	409.60	
105S	21	44								NO SAMPLE
105D	21	44								

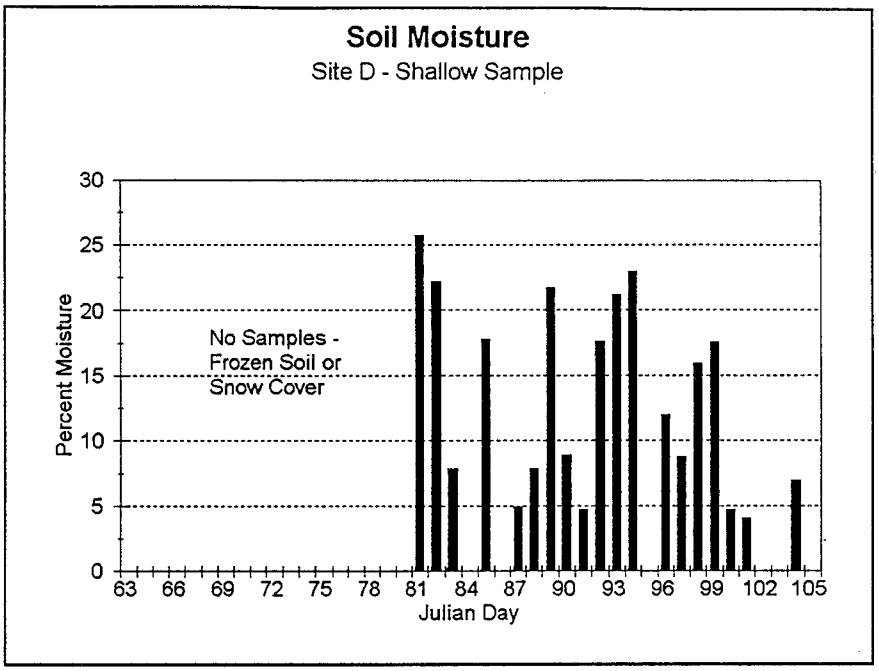


Figure E-5. 1-2 cm depth soil moisture at Site D

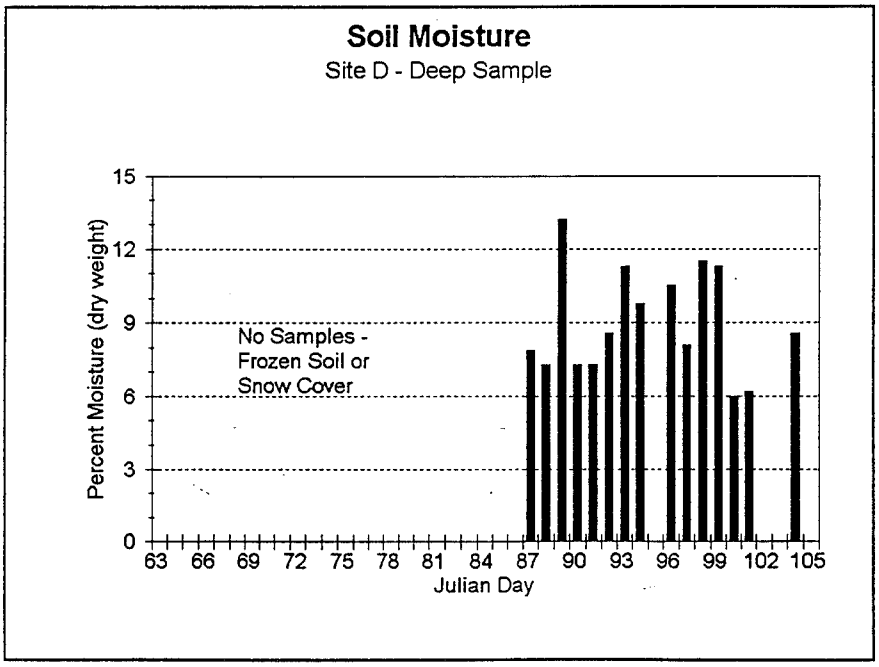


Figure E-6. 3-7 cm depth soil moisture at Site D

SOIL MOISTURE MEASUREMENTS SITE D										
MOISTURE SAMPLE POSITION DISTANCE FROM ORIGIN STAKE RIGHT SIDE OF LINE										
JULIAN	NUMBER	RAIN ALTERNATE	TIME	PERCENT	CAN	CAN	WET	24 HOUR	48 HOUR	COMMENT
DAY	OF PACES	NUM. OF PACES		MOISTURE	NUMBER	WEIGHT	WEIGHT	WEIGHT	WEIGHT	
63S	14	31								
63D	14	31								
64S	14	23								
64D	14	23								
65S	5	4								
65D	5	4								
66S	19	33								
66D	19	33								
67S	39	23								
67D	39	23								
68S	46	2								
68D	46	2								
69S	27	4								
69D	27	4								
70S	33	37								
70D	33	37								

SOIL MOISTURE MEASUREMENTS SITE D										
MOISTURE SAMPLE POSITION DISTANCE FROM ORIGIN STAKE RIGHT SIDE OF LINE										
JULIAN DAY	NUMBER OF PACES	RAIN ALTERNATE NUM. OF PACES	TIME	PERCENT MOISTURE	CAN NUMBER	CAN WEIGHT	WET WEIGHT	24 HOUR WEIGHT	48 HOUR WEIGHT	COMMENT
71S	34	7								
71D	34	7								
72S	44	9								
72D	44	9								
73S	18	10								
73D	18	10								
74S	19	14								
74D	19	14								
75S	46	26								
75D	46	26								
76S	10	3								
76D	10	3								
77S	38	9								
77D	38	9								
78S	25	32								
78D	25	32								

SOIL MOISTURE MEASUREMENTS SITE D										
MOISTURE SAMPLE POSITION DISTANCE FROM ORIGIN STAKE RIGHT SIDE OF LINE										
JULIAN DAY	NUMBER OF PACES	RAIN ALTERNATE NUM. OF PACES	TIME	PERCENT MOISTURE	CAN NUMBER	CAN WEIGHT	WET WEIGHT	24 HOUR WEIGHT	48 HOUR WEIGHT	COMMENT
79S	3	4								
79D	3	4								
80S	34	37								
80D	34	37								
81S	6	29	15:30	25.654	2	63.10	255.10	225.40	215.90	
81D	6	29								
82S	39	47	14:00	22.204	3	63.80	290.00	247.50	248.90	
82D	39	47								
83S	11	48	10:15	7.888	1	63.70	263.40	249.70	248.80	
83D	11	48								SNOW
84S	16	23								
84D	16	23								
85S	33	23	13:20	17.755	13	65.70	341.60	317.10	300.00	
85D	33	23								
86S	18	36								
86D	18	36								

SOIL MOISTURE MEASUREMENTS SITE D										
MOISTURE SAMPLE POSITION DISTANCE FROM ORIGIN STAKE RIGHT SIDE OF LINE										
JULIAN DAY	NUMBER OF PACES	RAIN ALTERNATE NUM. OF PACES	TIME	PERCENT MOISTURE	CAN NUMBER	CAN WEIGHT	WET WEIGHT	24 HOUR WEIGHT	48 HOUR WEIGHT	COMMENT
87S	50	37	14:15	4.870	25	66.00	320.10	308.60	308.30	
87D	50	37	14:15	7.912	12	63.40	319.80	301.00	301.00	
88S	39	46	16:15	7.901	12	63.30	358.30	335.70	336.70	
88D	39	46	16:15	7.342	13	65.70	511.60	480.90	481.10	
89S	20	34	12:35	21.696	1058	64.70	249.80	215.30	216.80	
89D	20	34	12:35	13.182	4	62.10	306.80	276.50	278.30	
90S	21	28	11:15	8.853	14	64.40	261.75	245.20	245.70	
90D	21	28	11:15	7.307	22	65.00	503.20	421.70	473.36	
91S	34	14	14:16	4.667	6	63.70	261.75	251.70	252.92	
91D	34	14	14:16	7.318	11	65.60	503.20	473.30	473.36	
92S	20	4	14:00	17.642	1	65.80	302.66	267.15	267.14	
92D	20	4	14:00	8.641	25	66.00	508.44	473.30	473.25	
93S	19	27	12:55	21.150	1006	62.70	290.34	253.78	250.60	
93D	19	27	12:55	11.338	1007	65.00	459.36	422.01	419.20	
94S	18	47	11:55	23.037	6	63.70	272.74	235.40	233.60	

SOIL MOISTURE MEASUREMENTS SITE D

MOISTURE SAMPLE POSITION DISTANCE FROM ORIGIN STAKE RIGHT SIDE OF LINE

JULIAN DAY	NUMBER OF PACES	RAIN ALTERNATE NUM. OF PACES	TIME	PERCENT MOISTURE	CAN NUMBER	CAN WEIGHT	WET WEIGHT	24 HOUR WEIGHT	48 HOUR WEIGHT	COMMENT
94D	18	47	11:55	9.753	26	64.70	469.14	433.80	433.20	
95S	21	3								SNOW
95D	21	3								
96S	27	5	15:15	12.032	20	63.20	431.00	392.20	391.50	
96D	27	5	15:15	10.511	308	63.40	396.70	365.90	365.00	
97S	33	4	14:26	8.780	16	63.70	390.80	364.60	364.40	
97D	33	4	14:26	8.116	24	63.80	412.80	386.80	386.60	
98S	12	17	14:40	15.921	3	62.70	298.60	266.30	266.20	
98D	12	17	14:40	11.547	6	63.70	370.90	339.30	339.10	
99S	4	44	15:46	17.490	4	62.10	321.40	283.30	282.80	
99D	4	44	15:46	11.283	15	63.90	402.20	368.40	367.90	
100S	39	44	15:20	4.696	12	63.40	462.50	444.60	444.60	
100D	39	44	15:20	5.978	17	65.70	452.20	430.40	430.40	
101S	46	33	13:00	4.068	5	65.20	382.40	369.50	370.00	
101D	46	33	13:00	6.198	6	63.70	406.40	386.40	386.40	

SOIL MOISTURE MEASUREMENTS SITE D										
MOISTURE SAMPLE POSITION DISTANCE FROM ORIGIN STAKE RIGHT SIDE OF LINE										
JULIAN DAY	NUMBER OF PACES	RAIN ALTERNATE NUM. OF PACES	TIME	PERCENT MOISTURE	CAN NUMBER	CAN WEIGHT	WET WEIGHT	24 HOUR WEIGHT	48 HOUR WEIGHT	COMMENT
102S	21	29								RAIN ALL DAY
102D	21	29								
103S	18	48								NO SAMPLE TAKEN
103D	18	48								
104S	35	26	17:00	6.924	15	63.90	402.10	380.20	380.20	
104D	35	26	17:00	8.560	23	62.80	417.90	389.90	389.90	
105S	45	25								NO SAMPLE
105D	45	25								

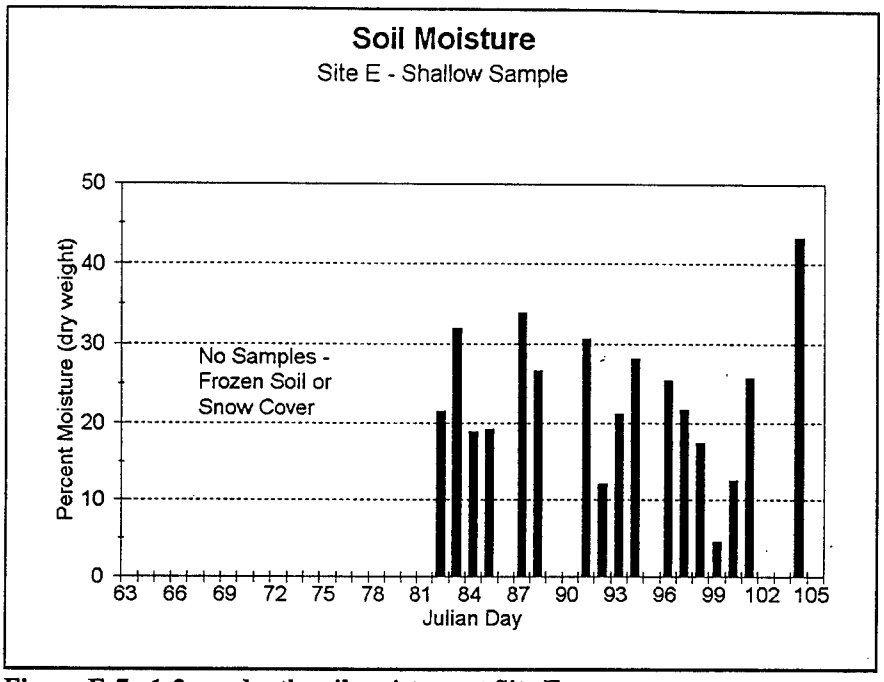


Figure E-7. 1-2 cm depth soil moisture at Site E

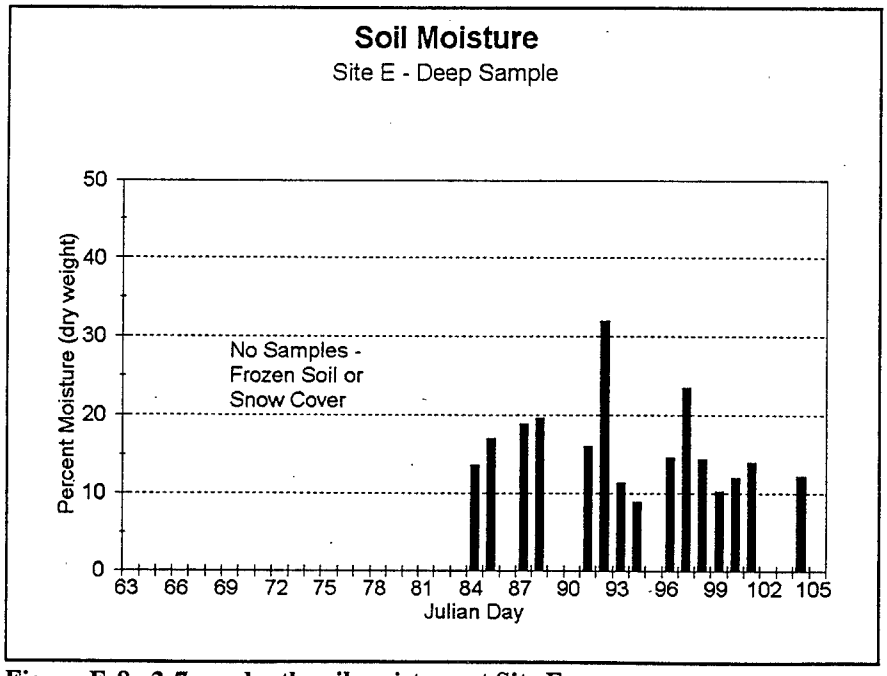


Figure E-8. 3-7 cm depth soil moisture at Site E

SOIL MOISTURE MEASUREMENTS SITE E

MOISTURE SAMPLE POSITION DISTANCE FROM REFERENCE STAKE CLOCKWISE

JULIAN DAY	REFERENCE CORNER	NUMBER OF PACES	RAIN ALTERNATE NUM. OF PACES	TIME	PERCENT MOISTURE	CAN NUMBER	CAN WEIGHT	WET WEIGHT	24 HOUR WEIGHT	48 HOUR WEIGHT	COMMENT
63S	W	7	16								
63D	W	7	16								
64S	W	48	3								
64D	W	48	3								
65S	S	10	37								
65D	S	10	37								
66S	W	40	30								
66D	W	40	30								
67S	N	10	21								
67D	N	10	21								
68S	W	42	34								
68D	W	42	34								
69S	E	12	26								
69D	E	12	26								
70S	W	32	20								

SOIL MOISTURE MEASUREMENTS SITE E											
MOISTURE SAMPLE POSITION DISTANCE FROM REFERENCE STAKE CLOCKWISE											
JULIAN	REFERENCE	NUMBER	RAIN ALTERNATE	TIME	PERCENT	CAN	CAN	WET	24 HOUR	48 HOUR	COMMENT
DAY	CORNER	OF PACES	NUM. OF PACES		MOISTURE	NUMBER	WEIGHT	WEIGHT	WEIGHT	WEIGHT	
70D	W	32	20								
71S	E	31	44								
71D	E	31	44								
72S	W	26	35								
72D	W	26	35								
73S	E	16	38								
73D	E	16	38								
74S	W	25	39								
74D	W	25	39								
75S	S	29	16								
75D	S	29	16								
76S	W	19	10								
76D	W	19	10								
77S	W	47	25								
77D	W	47	25								

SOIL MOISTURE MEASUREMENTS SITE E											
MOISTURE SAMPLE POSITION DISTANCE FROM REFERENCE STAKE CLOCKWISE											
JULIAN	REFERENCE	NUMBER	RAIN ALTERNATE	TIME	PERCENT	CAN	CAN	WET	24 HOUR	48 HOUR	COMMENT
DAY	CORNER	OF PACES	NUM. OF PACES		MOISTURE	NUMBER	WEIGHT	WEIGHT	WEIGHT	WEIGHT	
78S	W	43	9								
78D	W	43	9								
79S	W	13	4								
79D	W	13	4								
80S	W	30	21								
80D	W	30	21								
81S	E	8	45								
81D	E	8	45								
82S	S	3	14	14:00	21.521	1	64.90	317.30	296.80	272.60	
82D	S	3	14								
83S	E	22	13	10:40	31.862	2	63.30	254.50	225.50	208.30	
83D	E	22	13								SNOW
84S	E	19	5	14:07	18.938	11	65.60	235.80	207.70	208.70	
84D	E	19	5	14:07	13.680	12	63.40	253.70	229.30	230.80	
85S	E	11	16	13:40	19.221	16	63.70	302.50	265.60	264.00	

SOIL MOISTURE MEASUREMENTS SITE E											
MOISTURE SAMPLE POSITION DISTANCE FROM REFERENCE STAKE CLOCKWISE											
JULIAN DAY	REFERENCE CORNER	NUMBER OF PACES	RAIN ALTERNATE NUM. OF PACES	TIME	PERCENT MOISTURE	CAN NUMBER	CAN WEIGHT	WET WEIGHT	24 HOUR WEIGHT	48 HOUR WEIGHT	COMMENT
85D	E	11	16	13:40	16.950	18	64.20	311.90	278.80	276.00	
86S	E	6	32								
86D	E	6	32								
87S	E	23	10	14:34	33.852	23	62.80	260.50	234.70	210.50	
87D	E	23	10	14:34	18.897	24	63.80	346.30	305.00	301.40	
88S	W	22	3	16:50	26.581	17	63.00	359.20	296.50	297.00	
88D	W	22	3	16:50	19.678	18	63.60	406.00	349.40	349.70	
89S	N	10	7								SNOW
89D	N	10	7								
90S	W	43	13								SNOW/ICE COVER
90D	W	43	13								
91S	S	31	31	14:50	30.594	3	62.70	412.47	330.76	330.53	
91D	S	31	31	14:50	16.099	26	64.70	525.22	461.40	461.36	
92S	W	15	14	14:45	8.614	16	63.70	402.24	375.39	375.39	
92D	W	15	14	14:45	9.948	19	63.00	559.56	514.88	514.63	

SOIL MOISTURE MEASUREMENTS SITE E											
MOISTURE SAMPLE POSITION DISTANCE FROM REFERENCE STAKE CLOCKWISE											
JULIAN DAY	REFERENCE CORNER	NUMBER OF PACES	RAIN ALTERNATE NUM. OF PACES	TIME	PERCENT MOISTURE	CAN NUMBER	CAN WEIGHT	WET WEIGHT	24 HOUR WEIGHT	48 HOUR WEIGHT	COMMENT
93S	E	25	40	13:36	12.059	4	62.10	320.62	295.79	292.80	
93D	E	25	40	13:36	31.931	14	64.40	438.16	350.12	347.70	
94S	N	3	24	12:30	28.109	5	65.20	416.09	348.70	339.10	
94D	N	3	24	12:30	8.894	6	63.30	528.06	493.30	490.10	
95S	W	28	42								SNOW
95D	W	28	42								
96S	N	1	32	15:40	25.375	1007	65.00	365.90	305.40	305.00	
96D	N	1	32	15:40	14.567	1078	63.00	406.70	363.20	363.00	
97S	N	23	20	14:49	21.691	18	64.20	375.00	319.90	319.60	
97D	N	23	20	14:49	23.412	25	66.00	386.50	326.00	325.70	
98S	E	24	22	15:07	17.452	19	63.00	364.50	319.90	319.70	
98D	E	24	22	15:07	14.439	26	64.70	394.40	353.20	352.80	
99S	N	38	47	16:10	4.591	2	63.00	441.20	426.00	424.60	
99D	N	38	47	16:10	10.182	23	62.80	408.00	376.20	376.10	
100S	W	11	39	15:43	12.515	112	63.30	351.00	319.10	319.00	

SOIL MOISTURE MEASUREMENTS SITE E

MOISTURE SAMPLE POSITION DISTANCE FROM REFERENCE STAKE CLOCKWISE

JULIAN DAY	REFERENCE CORNER	NUMBER OF PACES	RAIN ALTERNATE NUM. OF PACES	TIME	PERCENT MOISTURE	CAN NUMBER	CAN WEIGHT	WET WEIGHT	24 HOUR WEIGHT	48 HOUR WEIGHT	COMMENT
100D	W	11	39	15:43	12.035	1007	65.60	472.40	428.70	428.70	
101S	N	31	46	13:23	25.849	22	65.00	357.60	297.90	297.50	
101D	N	31	46	13:23	14.032	26	64.70	367.00	330.30	329.80	
102S	W	26	32								RAIN ALL DAY
102D	W	26	32								
103S	E	16	28								NO SAMPLE TAKEN
103D	E	16	28								
104S	W	38	33	17:25	43.328	2	63.00	249.90	193.40	193.40	
104D	W	38	33	17:25	12.203	4	62.10	411.50	373.50	373.50	
105S	E	7	40								NO SAMPLE
105D	E	7	40								

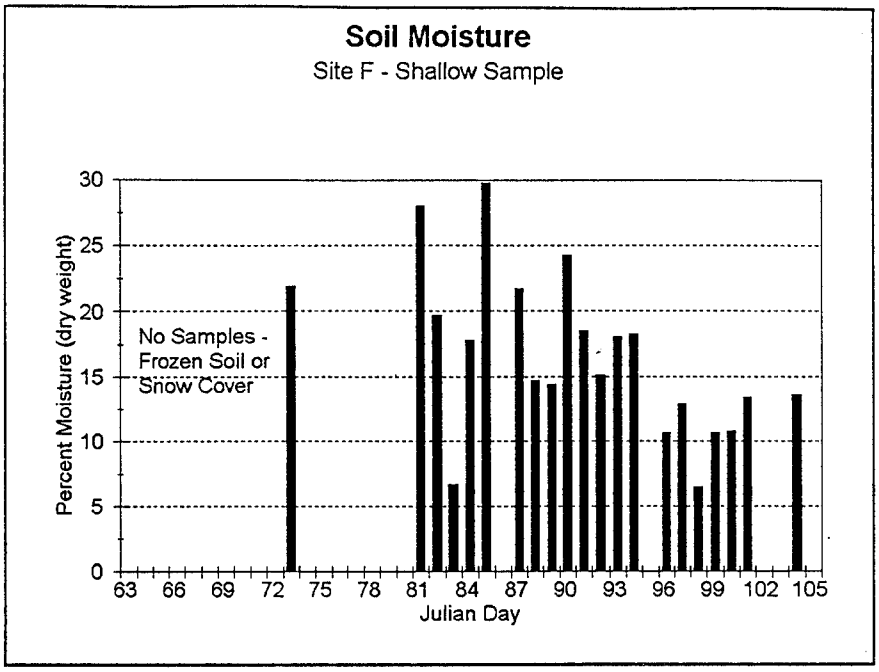


Figure E-9. 1-2 cm depth soil moisture at Site F

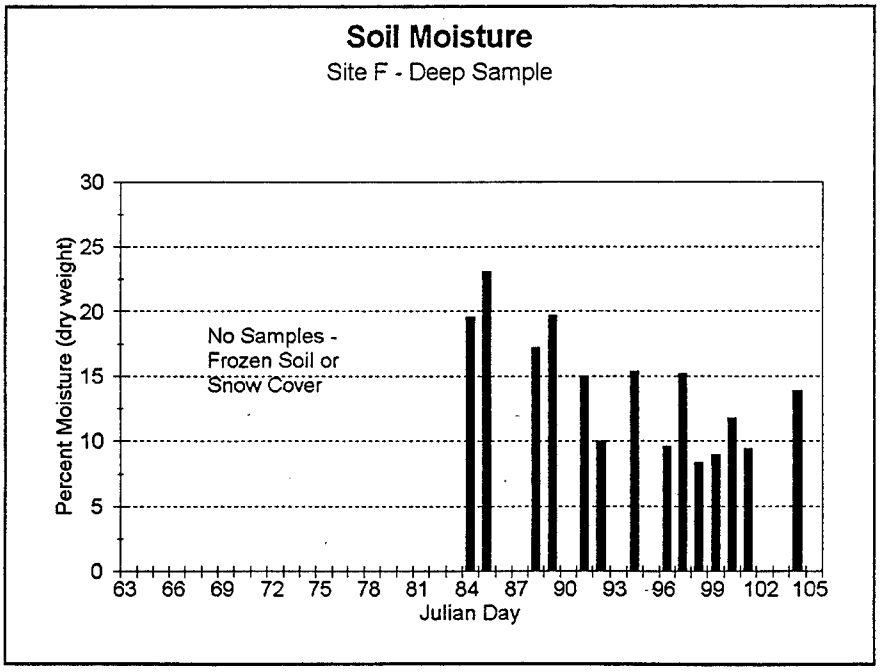


Figure E-10. 3-7 cm depth soil moisture at Site F

SOIL MOISTURE MEASUREMENTS SITE F										
MOISTURE SAMPLE POSITION DISTANCE FROM ORIGIN STAKE RIGHT SIDE OF LINE										
JULIAN DAY	NUMBER OF PACES	RAIN ALTERNATE NUM. OF PACES	TIME	PERCENT MOISTURE	CAN NUMBER	CAN WEIGHT	WET WEIGHT	24 HOUR WEIGHT	48 HOUR WEIGHT	COMMENT
63S	10	22								
63D	10	22								
64S	39	40								
64D	39	40								
65S	29	44								
65D	29	44								
66S	47	40								
66D	47	40								
67S	29	26								
67D	29	26								
68S	41	1								
68D	41	1								
69S	38	41								
69D	38	41								
70S	46	10								
70D	46	10								

SOIL MOISTURE MEASUREMENTS SITE F										
MOISTURE SAMPLE POSITION DISTANCE FROM ORIGIN STAKE RIGHT SIDE OF LINE										
JULIAN DAY	NUMBER OF PACES	RAIN ALTERNATE NUM. OF PACES	TIME	PERCENT MOISTURE	CAN NUMBER	CAN WEIGHT	WET WEIGHT	24 HOUR WEIGHT	48 HOUR WEIGHT	COMMENT
71S	28	12								
71D	28	12								
72S	2	15	16:50	21.892	1	63.60	282.40	248.10	234.50	
72D	2	15								
73S	4	10								
73D	4	10								
74S	13	14								
74D	13	14								
75S	22	25								
75D	22	25								
76S	14	34								
76D	14	34								
77S	24	19								
77D	24	19								
78S	39	40								

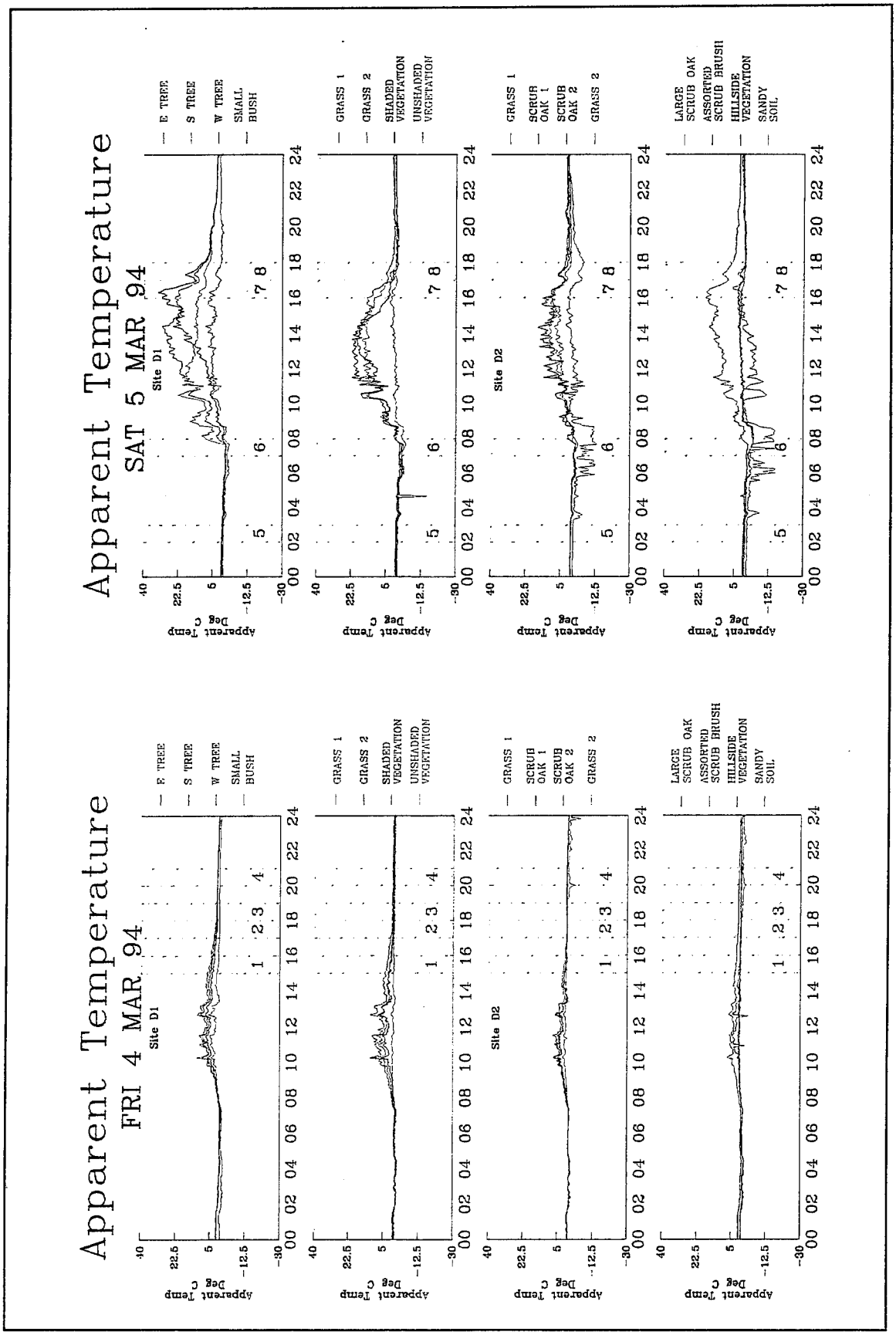
SOIL MOISTURE MEASUREMENTS SITE F										
MOISTURE SAMPLE POSITION DISTANCE FROM ORIGIN STAKE RIGHT SIDE OF LINE										
JULIAN	NUMBER	RAIN ALTERNATE	TIME	PERCENT	CAN	CAN	WET	24 HOUR	48 HOUR	COMMENT
DAY	OF PACES	NUM. OF PACES		MOISTURE	NUMBER	WEIGHT	WEIGHT	WEIGHT	WEIGHT	
78D	39	40								
79S	34	26								
79D	34	26								
80S	15	13								
80D	15	13								
81S	49	8	15:29	27.980	1	63.00	239.10	201.00	200.60	
81D	49	8								
82S	40	38	14:00	19.686	2	62.80	344.90	319.10	298.50	
82D	40	38								
83S	49	49	10:30	6.673	3	63.00	277.20	262.80	263.80	
83D	49	49								SNOW
84S	35	14	14:15	17.756	4	62.10	258.40	228.90	228.80	
84D	35	14	14:15	19.586	5	65.20	273.40	247.90	239.30	
85S	36	23	13:30	29.816	22	63.20	338.80	287.00	275.50	
85D	36	23	13:30	23.116	20	65.00	310.00	272.00	264.00	

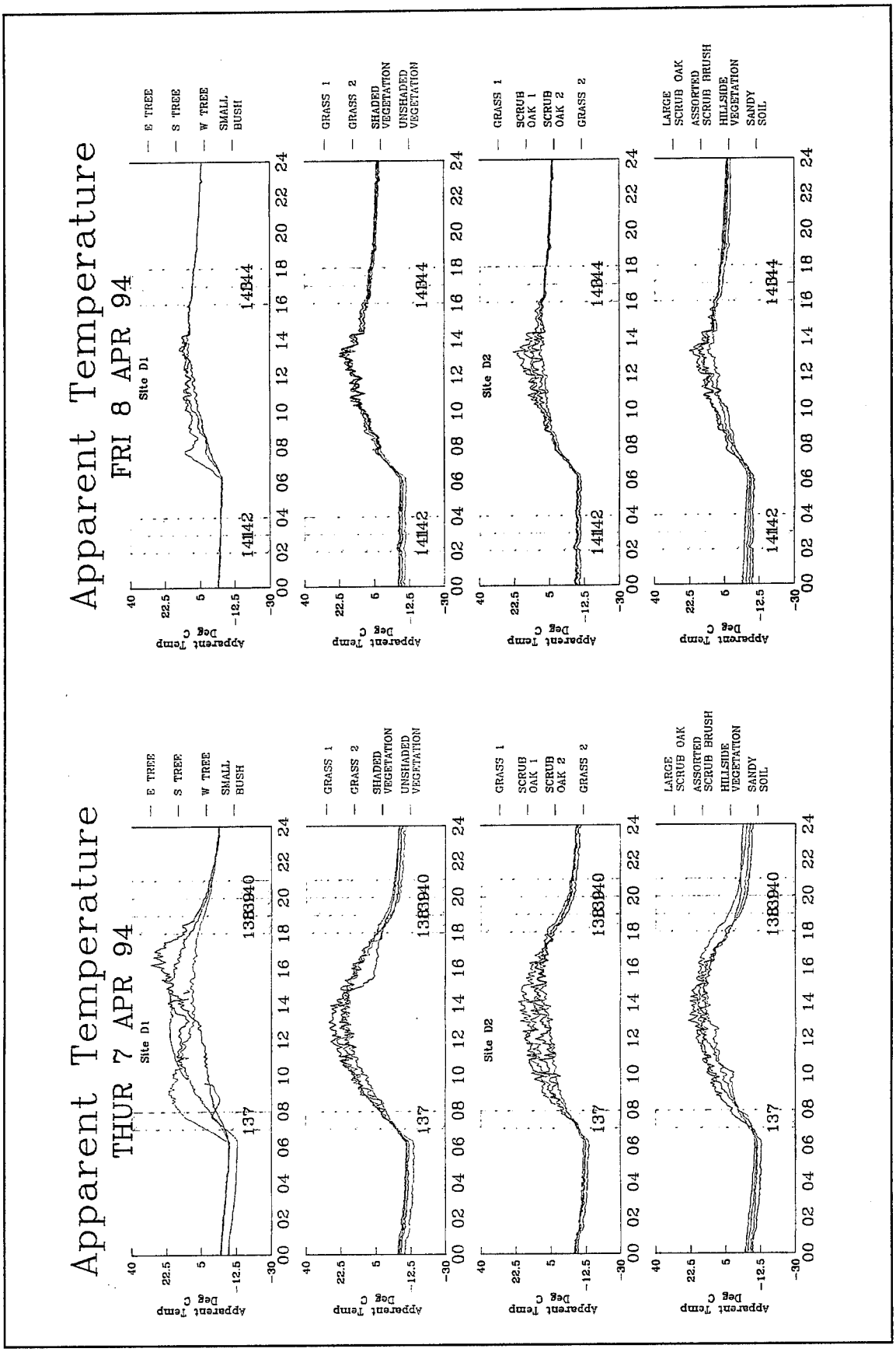
SOIL MOISTURE MEASUREMENTS SITE F										
MOISTURE SAMPLE POSITION DISTANCE FROM ORIGIN STAKE RIGHT SIDE OF LINE										
JULIAN DAY	NUMBER OF PACES	RAIN ALTERNATE NUM. OF PACES	TIME	PERCENT MOISTURE	CAN NUMBER	CAN WEIGHT	WET WEIGHT	24 HOUR WEIGHT	48 HOUR WEIGHT	COMMENT
86S	33	35								
86D	33	35								
87S	10	7	14:25	21.736	26	64.70	234.40	213.30	204.10	
87D	10	7								
88S	2	19	16:30	14.700	19	63.00	332.20	296.10	297.70	
88D	2	19	16:30	17.221	20	63.20	458.00	400.00	400.00	
89S	34	3	12:45	14.413	15	63.90	333.80	298.90	299.80	
89D	34	3	12:45	19.690	16	63.70	380.40	327.00	328.30	
90S	29	3	11:30	24.303	2	63.00	281.40	238.60	238.70	
90D	29	3								FROZEN GROUND
91S	27	20	14:35	18.536	21	63.60	289.21	253.30	253.93	
91D	27	20	14:35	14.955	23	62.80	495.26	438.90	439.00	
92S	39	12	14:22	15.147	12	63.40	370.21	329.97	329.85	
92D	39	12	14:22	9.958	17	63.70	495.13	465.15	456.06	
93S	17	19	13:08	18.115	12	63.30	310.87	275.85	272.90	

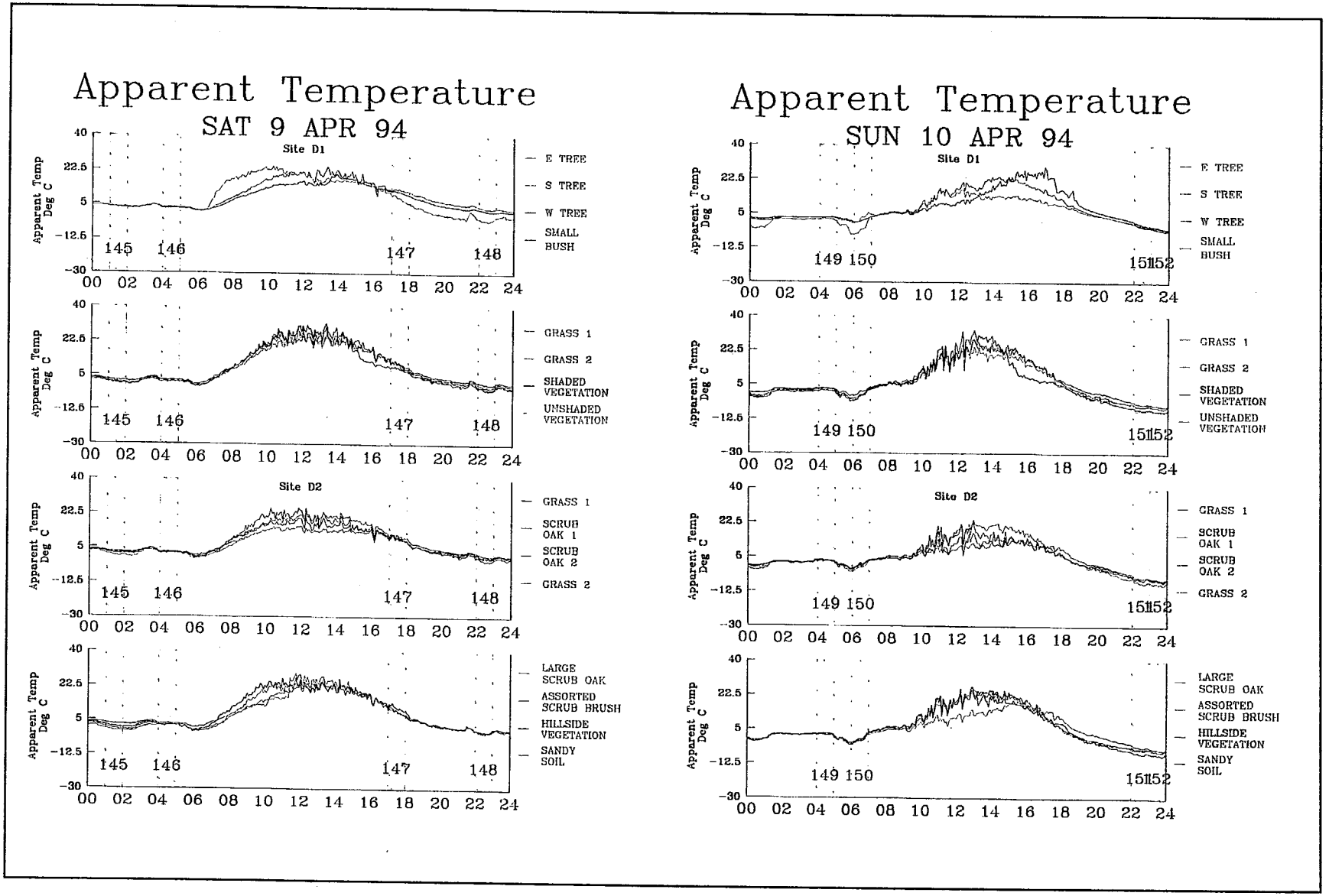
SOIL MOISTURE MEASUREMENTS SITE F										
MOISTURE SAMPLE POSITION DISTANCE FROM ORIGIN STAKE RIGHT SIDE OF LINE										
JULIAN DAY	NUMBER OF PACES	RAIN ALTERNATE NUM. OF PACES	TIME	PERCENT MOISTURE	CAN NUMBER	CAN WEIGHT	WET WEIGHT	24 HOUR WEIGHT	48 HOUR WEIGHT	COMMENT
93D	17	19								FROZEN GROUND
94S	30	24	12:15	18.302	21	63.60	361.84	323.60	315.70	
94D	30	24	12:15	15.430	1007	65.60	456.56	408.70	404.30	
95S	49	16								SNOW
95D	49	16								
96S	23	20	15:25	10.730	2	63.00	418.00	384.20	383.60	
96D	23	20	15:25	9.586	4	62.10	509.10	470.60	470.00	
97S	28	7	14:35	12.881	12	63.30	485.70	437.60	437.50	
97D	28	7	14:35	15.226	13	65.70	457.70	406.20	405.90	
98S	24	10	14:55	6.483	601	63.30	426.30	404.90	404.20	
98D	24	10	14:55	8.437	1006	62.70	427.70	400.20	399.30	
99S	38	38	15:56	10.678	308	63.40	424.10	389.10	389.30	
99D	38	38	15:56	9.024	1007	65.00	479.40	445.40	445.10	
100S	13	8	15:30	10.817	16	63.70	428.40	392.70	392.80	
100D	13	8	15:30	11.777	24	63.80	442.50	402.60	402.60	

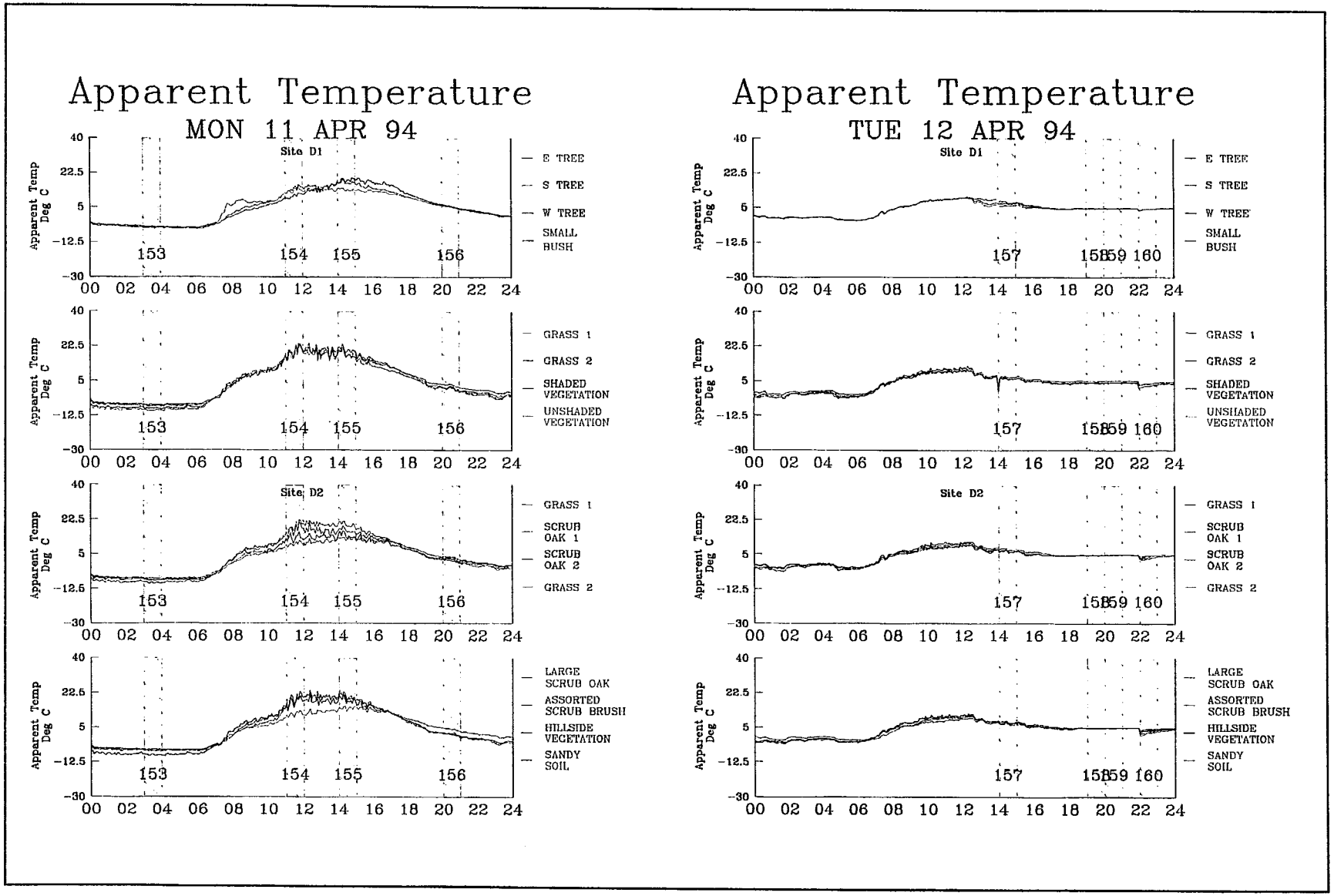
SOIL MOISTURE MEASUREMENTS SITE F										
MOISTURE SAMPLE POSITION DISTANCE FROM ORIGIN STAKE RIGHT SIDE OF LINE										
JULIAN DAY	NUMBER OF PACES	RAIN ALTERNATE NUM. OF PACES	TIME	PERCENT MOISTURE	CAN NUMBER	CAN WEIGHT	WET WEIGHT	24 HOUR WEIGHT	48 HOUR WEIGHT	COMMENT
101S	16	10	13:10	13.420	19	63.00	394.30	355.90	355.10	
101D	16	10	13:10	9.374	21	63.60	432.30	401.90	400.70	
102S	3	34								
102D	3	34								
103S	41	9								
103D	41	9								
104S	42	10	17:10	13.644	1058	64.70	396.20	356.40	356.40	
104D	42	10	17:10	13.870	1778	63.00	324.90	293.00	293.00	
105S	48	9								NO SAMPLE
105D	48	9								

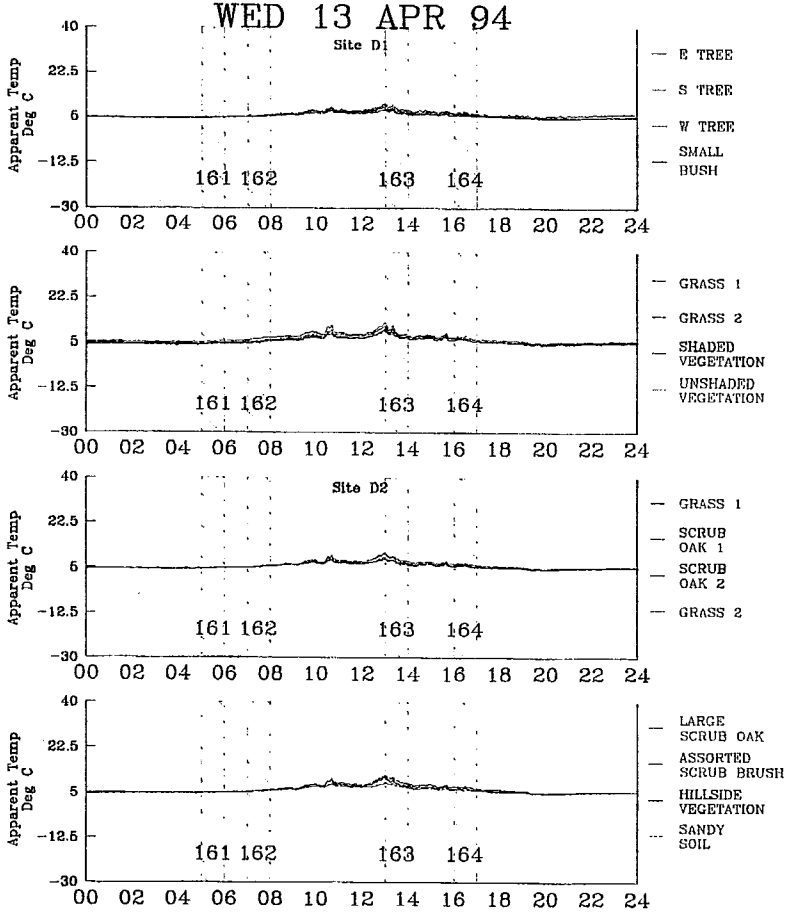
Appendix F
Apparent Temperature Data Summaries

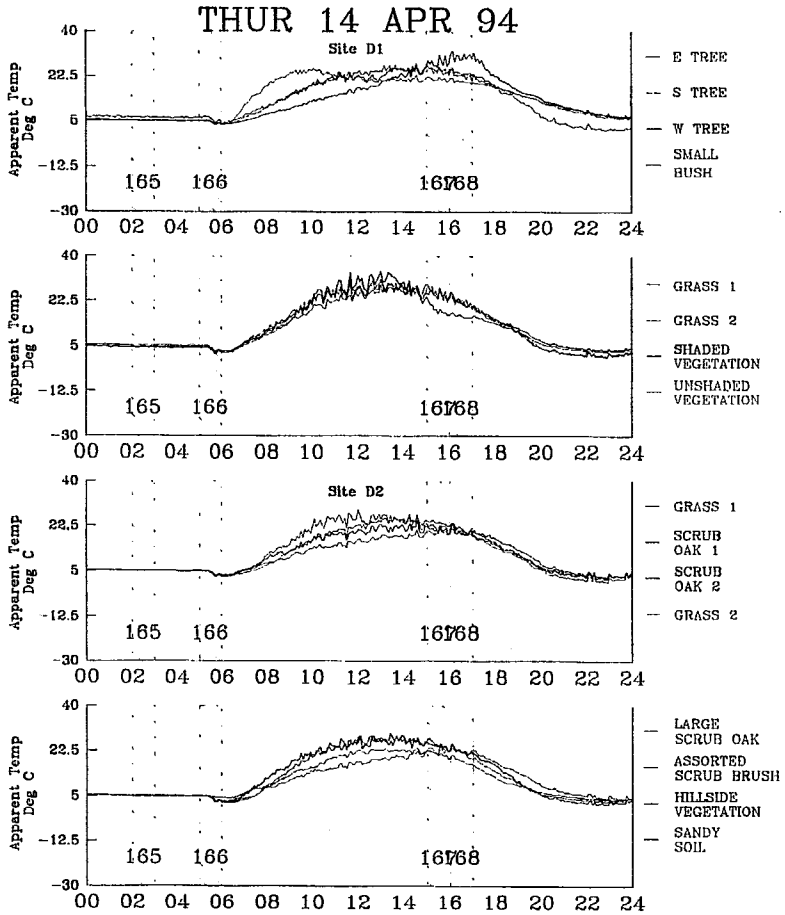

Apparent Temperature
FRI 4 MAR 94
Site D1
Site D2
E TREE
S TREE
W TREE
SMALL BUSH
GRASS 1
GRASS 2
SHADED VEGETATION
UNSHADED VEGETATION
SCRUB OAK 1
SCRUB OAK 2
LARGE SCRUB OAK
ASSORTED SCRUB BRUSH
HILLSIDE VEGETATION
SANDY SOIL
Apparent Temperature
SAT 5 MAR 94
Apparent Temp Deg C
40
22.5
5
-12.5
-30
00 02 04 06 08 10 12 14 16 18 20 22 24
1 2 3 4
5 6 7 8

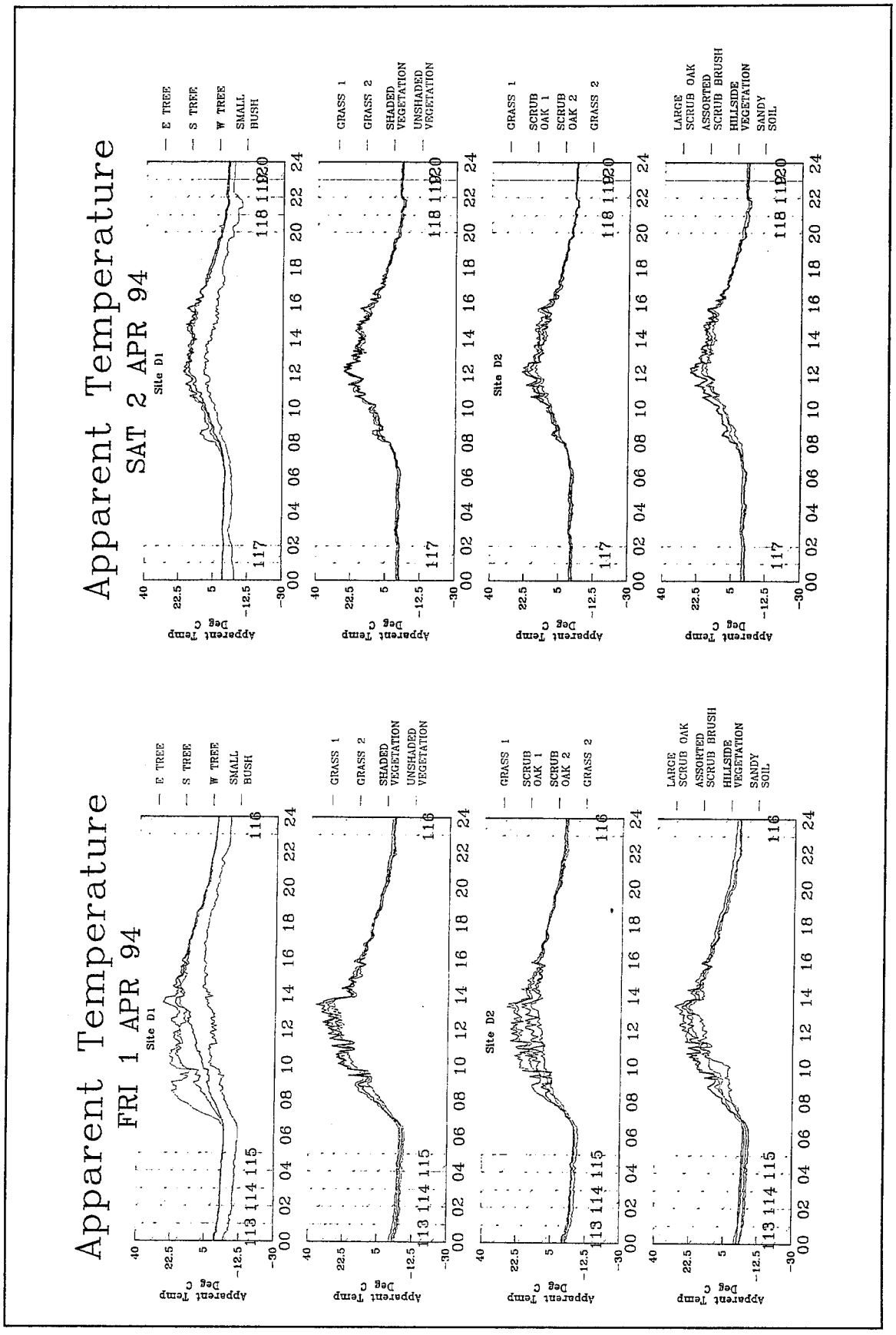

Apparent Temperature
THUR 7 APR 94
Site D1
Site D2
Apparent Temperature
FRI 8 APR 94
Site D1
Site D2
Apparent Temp Deg C
E TREE
S TREE
W TREE
SMALL BUSH
GRASS 1
GRASS 2
SHADED VEGETATION
UNSHADED VEGETATION
SCRUB OAK 1
SCRUB OAK 2
LARGE SCRUB OAK
ASSORTED SCRUB BRUSH
HILLSIDE VEGETATION
SANDY SOIL
13B940
14B44
14142
137

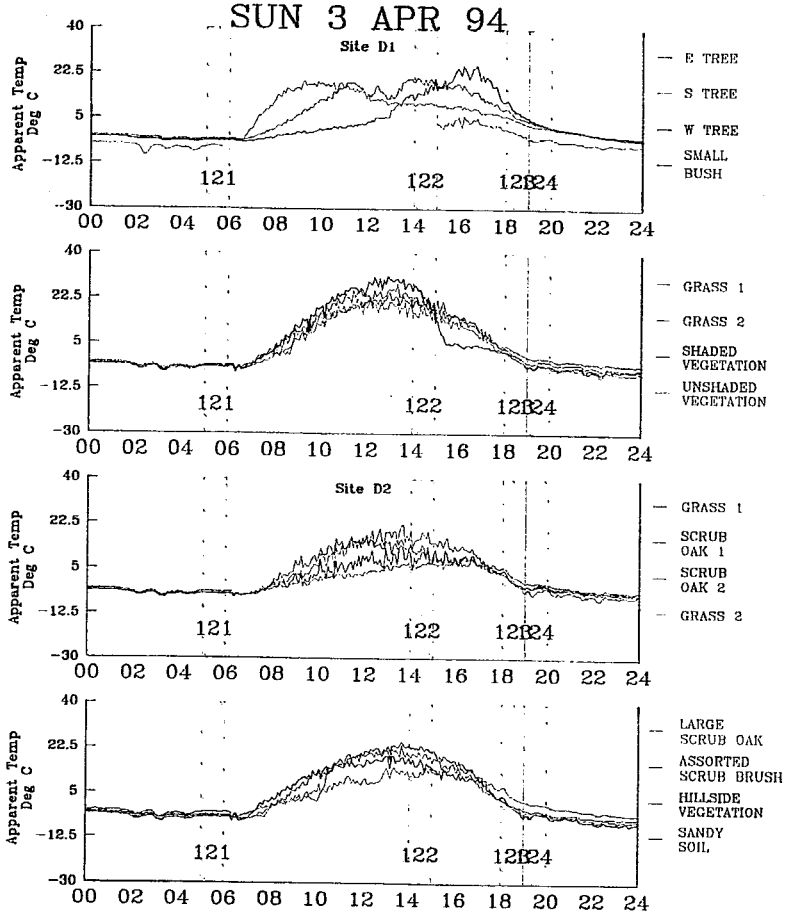

Apparent Temperature
SAT 9 APR 94
Site D1
Apparent Temp Deg C
E TREE
S TREE
W TREE
SMALL BUSH
GRASS 1
GRASS 2
SHADED VEGETATION
UNSHADED VEGETATION
Site D2
SCRUB OAK 1
SCRUB OAK 2
LARGE SCRUB OAK
ASSORTED SCRUB BRUSH
HILLSIDE VEGETATION
SANDY SOIL
145 146 147 148
00 02 04 06 08 10 12 14 16 18 20 22 24
Apparent Temperature
SUN 10 APR 94
149 150 151152

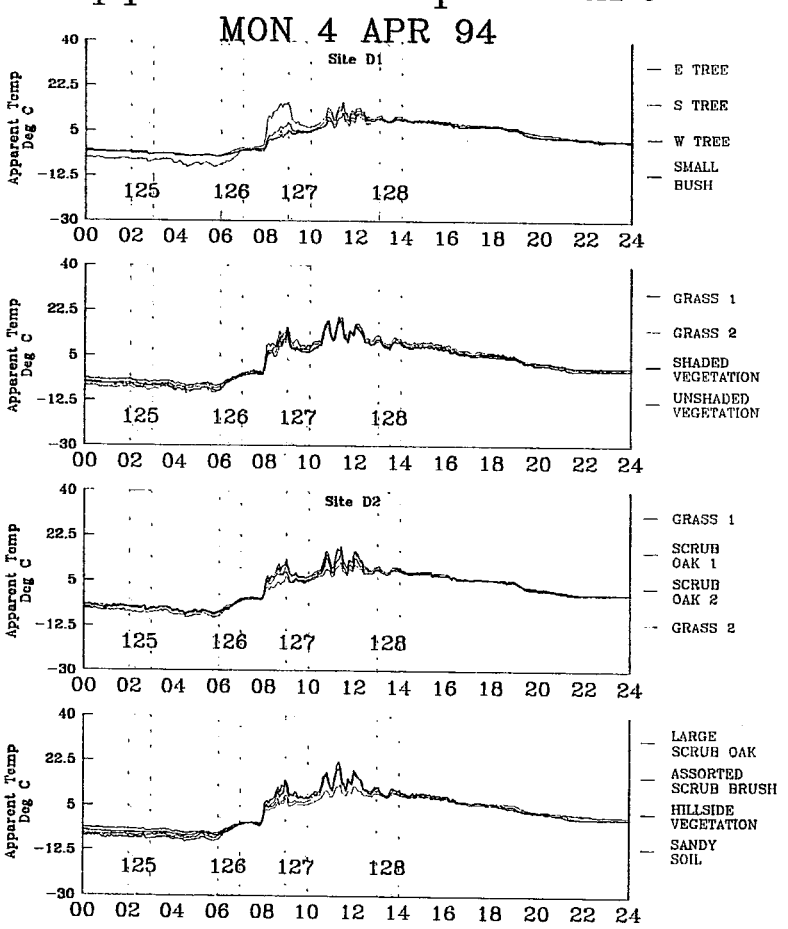

Apparent Temperature
MON 11 APR 94
Site D1
Site D2
Apparent Temp Deg C
40
22.5
5
-12.5
-30
00 02 04 06 08 10 12 14 16 18 20 22 24
153
154
155
156
E TREE
S TREE
W TREE
SMALL BUSH
GRASS 1
GRASS 2
SHADED VEGETATION
UNSHADED VEGETATION
SCRUB OAK 1
SCRUB OAK 2
LARGE SCRUB OAK
ASSORTED SCRUB BRUSH
HILLSIDE VEGETATION
SANDY SOIL
Apparent Temperature
TUE 12 APR 94
Site D1
Site D2
157
158
159
160

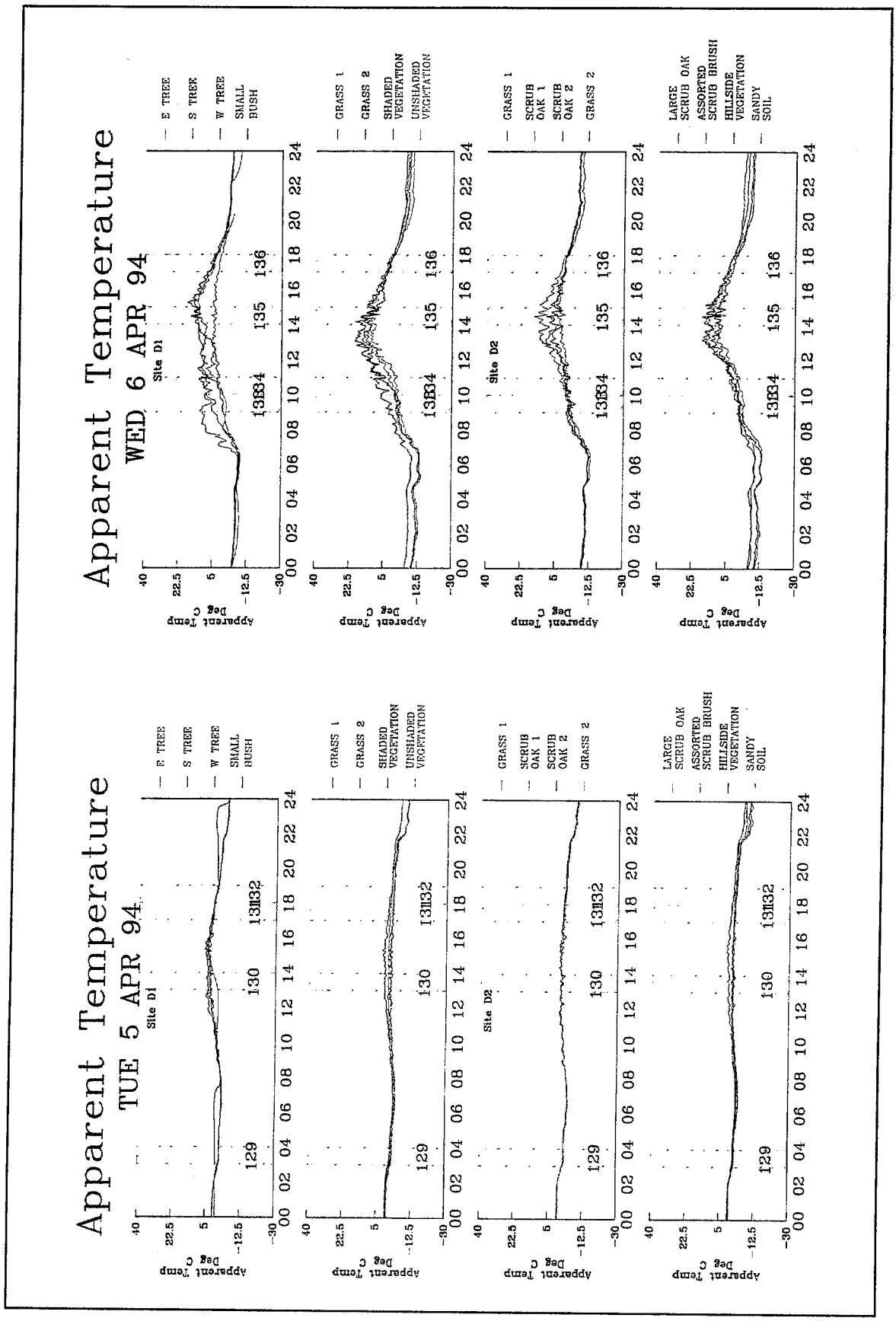

Apparent Temperature
WED 13 APR 94
Site D1
Apparent Temp Deg C
E TREE
S TREE
W TREE
SMALL BUSH
GRASS 1
GRASS 2
SHADED VEGETATION
UNSHADED VEGETATION
Site D2
SCRUB OAK 1
SCRUB OAK 2
LARGE SCRUB OAK
ASSORTED SCRUB BRUSH
HILLSIDE VEGETATION
SANDY SOIL
161 162 163 164
00 02 04 06 08 10 12 14 16 18 20 22 24

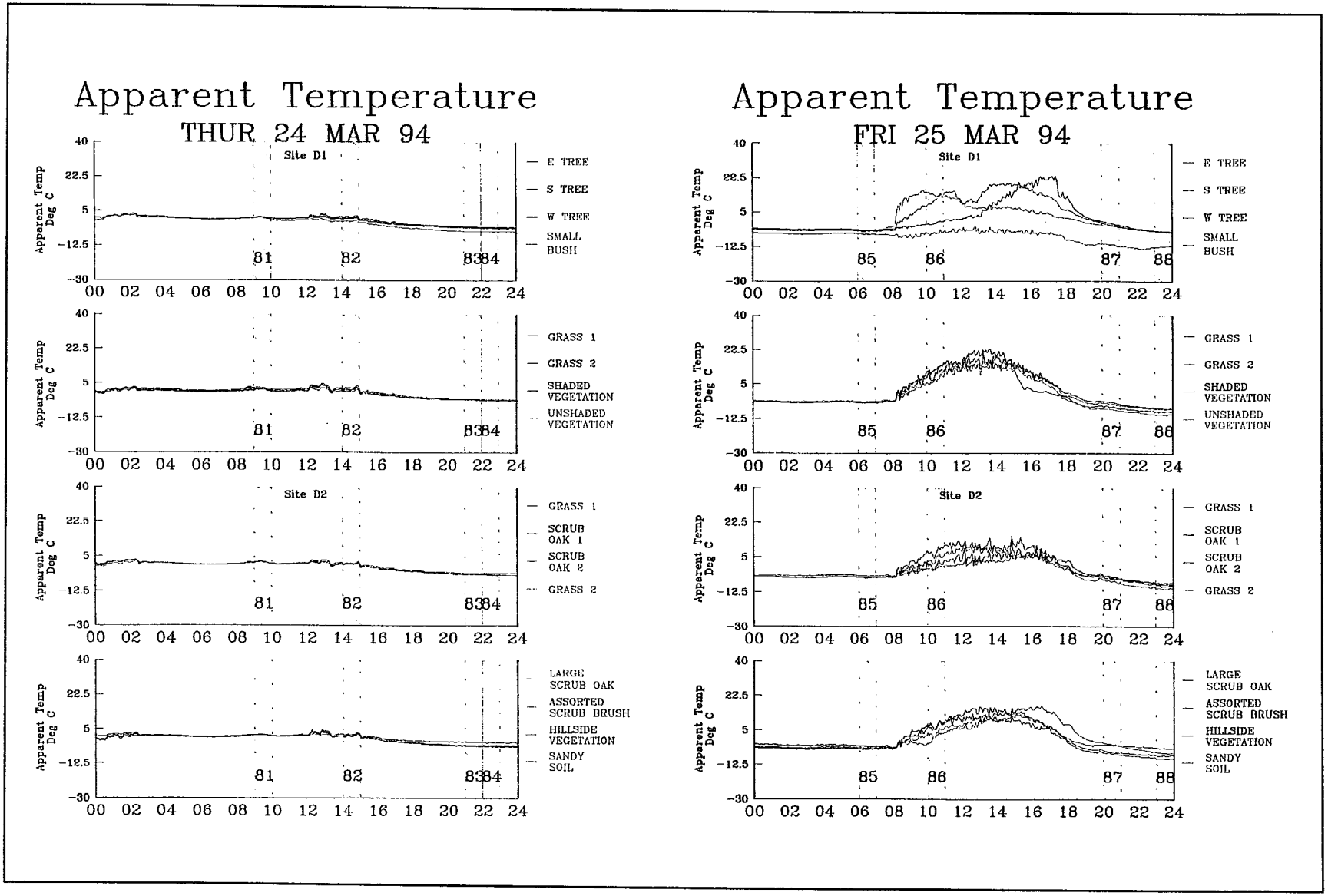

Apparent Temperature
THUR 14 APR 94
Site D1
Apparent Temp Deg C
E TREE
S TREE
W TREE
SMALL BUSH
GRASS 1
GRASS 2
SHADED VEGETATION
UNSHADED VEGETATION
Site D2
SCRUB OAK 1
SCRUB OAK 2
LARGE SCRUB OAK
ASSORTED SCRUB BRUSH
HILLSIDE VEGETATION
SANDY SOIL
165 166 167 168
00 02 04 06 08 10 12 14 16 18 20 22 24

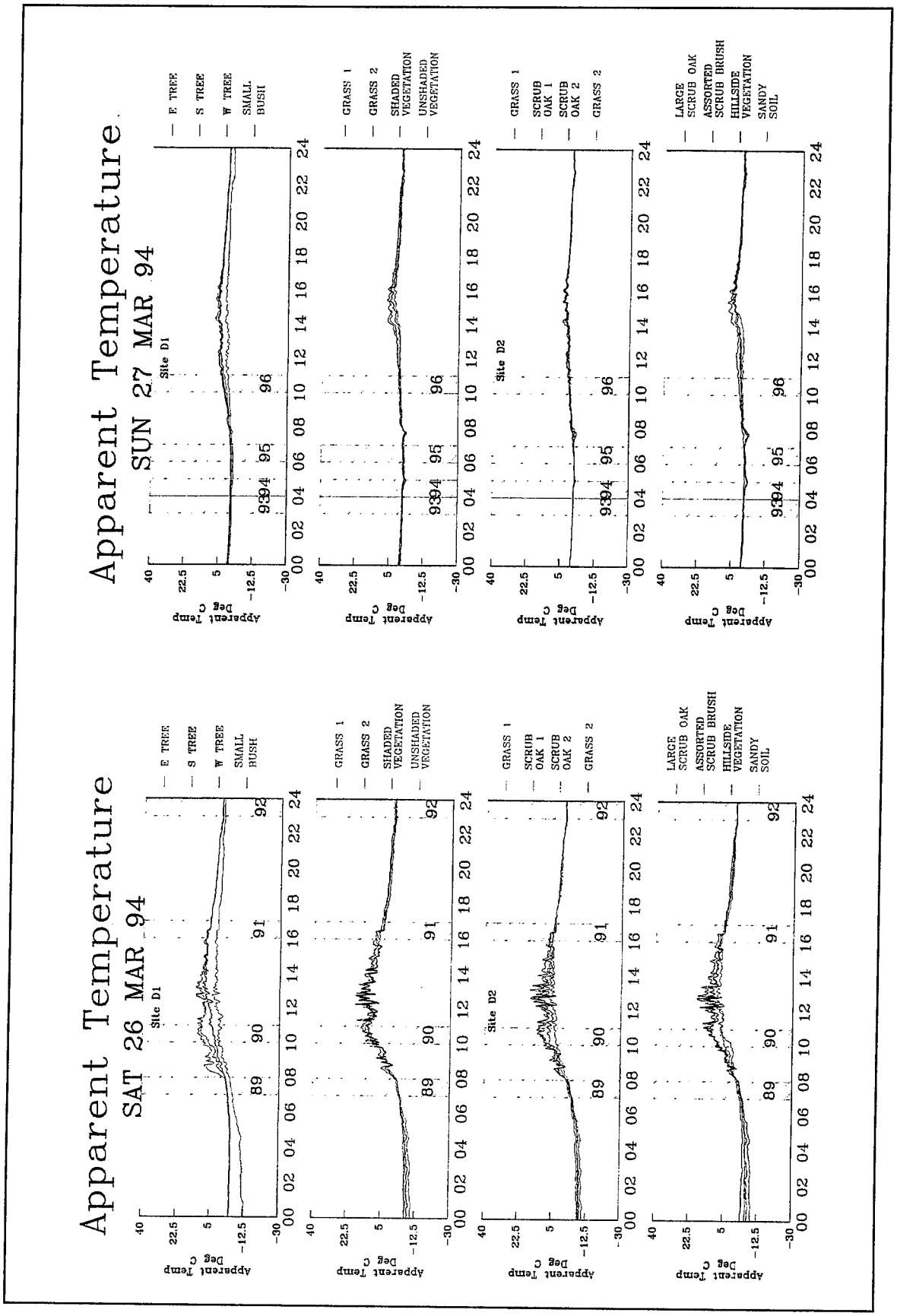

Apparent Temperature
FRI 1 APR 94
Site D1
Site D2
Apparent Temp Deg C
E TREE
S TREE
W TREE
SMALL BUSH
GRASS 1
GRASS 2
SHADED VEGETATION
UNSHADED VEGETATION
SCRUB OAK 1
SCRUB OAK 2
LARGE SCRUB OAK
ASSORTED SCRUB BRUSH
HILLSIDE VEGETATION
SANDY SOIL
Apparent Temperature
SAT 2 APR 94
Site D1
Site D2

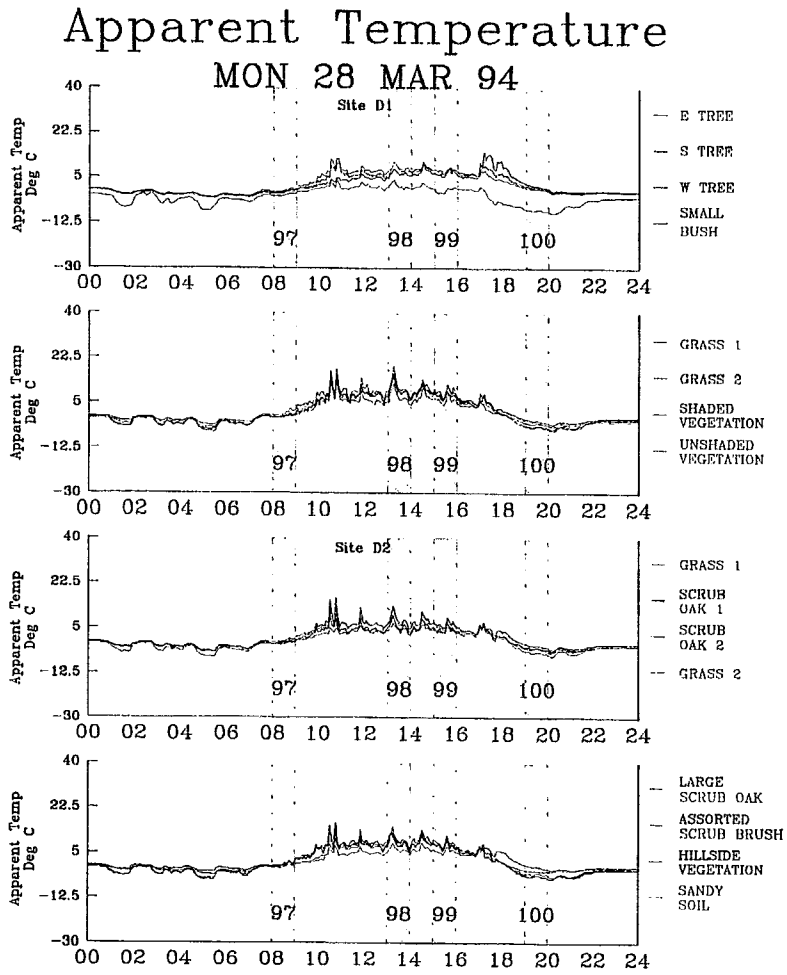

Apparent Temperature
SUN 3 APR 94
Site D1
Apparent Temp Deg C
E TREE
S TREE
W TREE
SMALL BUSH
GRASS 1
GRASS 2
SHADED VEGETATION
UNSHADED VEGETATION
Site D2
SCRUB OAK 1
SCRUB OAK 2
LARGE SCRUB OAK
ASSORTED SCRUB BRUSH
HILLSIDE VEGETATION
SANDY SOIL
121
122
123
124
00 02 04 06 08 10 12 14 16 18 20 22 24

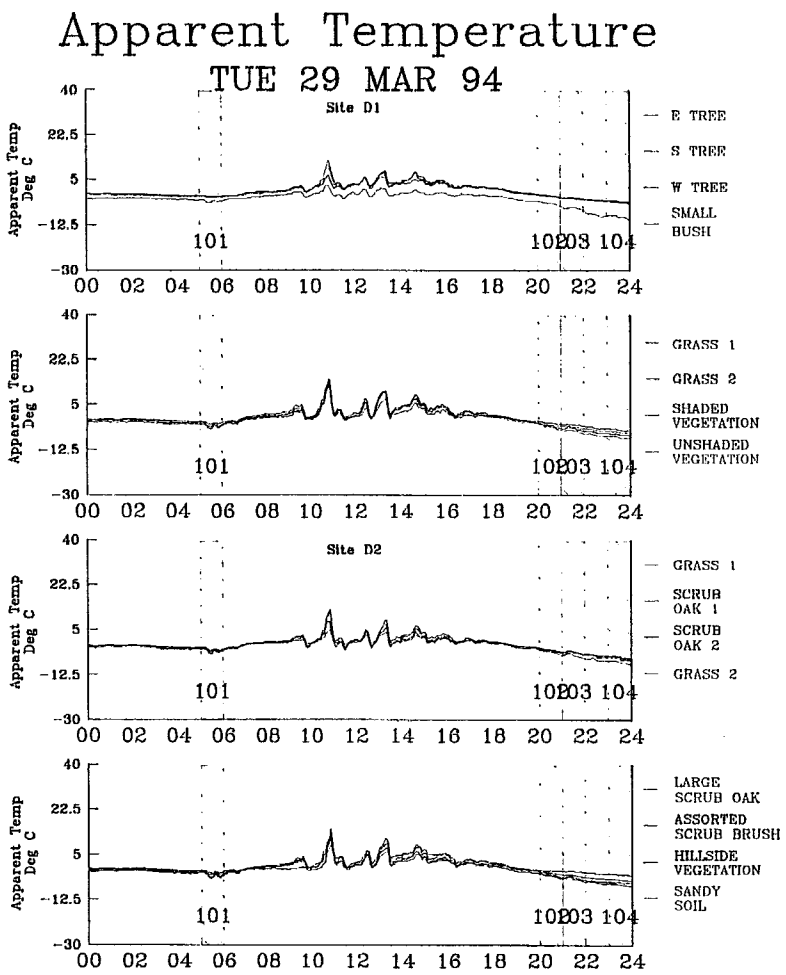

Apparent Temperature
MON 4 APR 94
Site D1
Apparent Temp Deg C
E TREE
S TREE
W TREE
SMALL BUSH
GRASS 1
GRASS 2
SHADED VEGETATION
UNSHADED VEGETATION
Site D2
SCRUB OAK 1
SCRUB OAK 2
LARGE SCRUB OAK
ASSORTED SCRUB BRUSH
HILLSIDE VEGETATION
SANDY SOIL
125
126
127
128
00 02 04 06 08 10 12 14 16 18 20 22 24

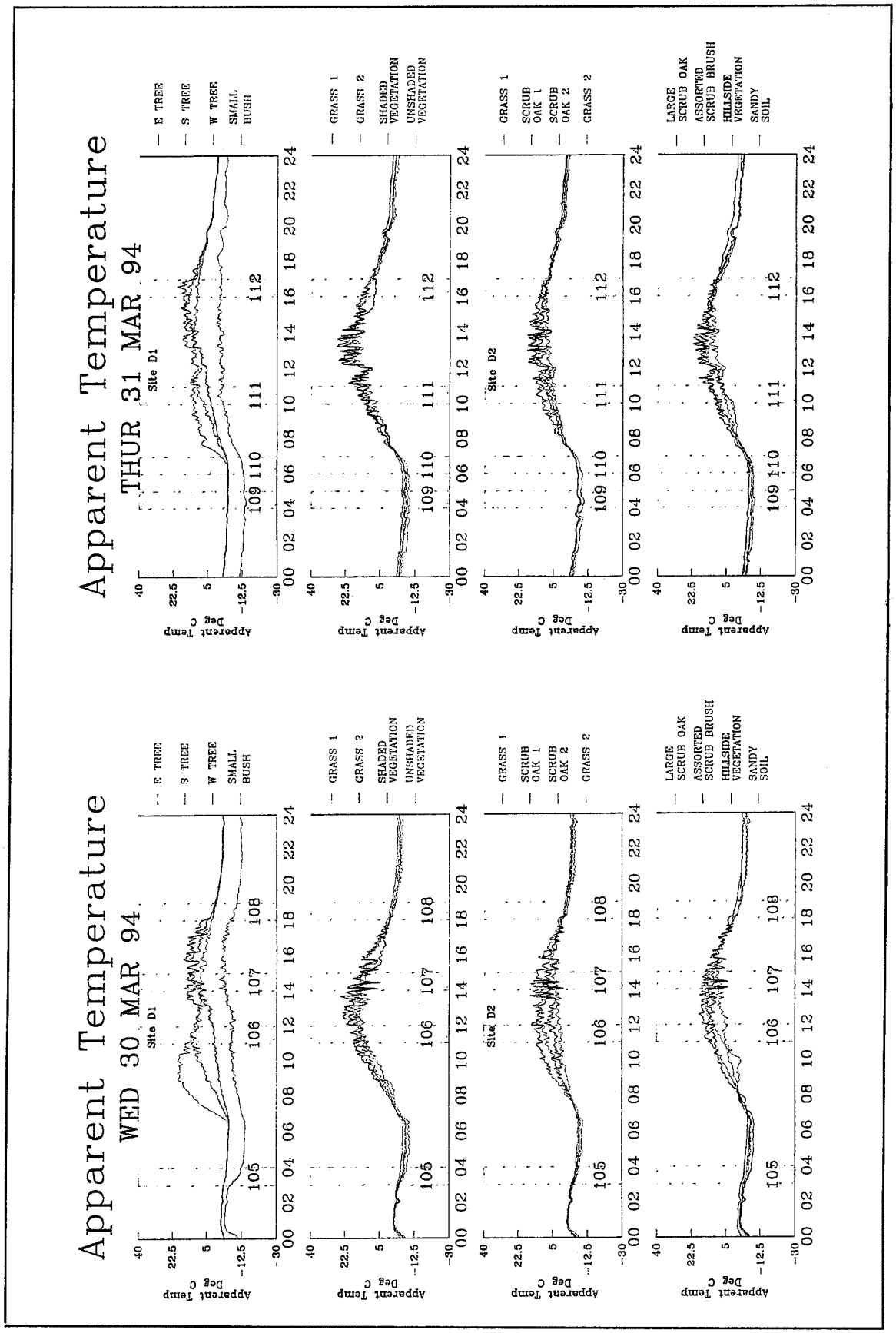

Apparent Temperature
TUE 5 APR 94
Site D1
E TREE
S TREE
W TREE
SMALL BUSH
GRASS 1
GRASS 2
SHADED VEGETATION
UNSHADED VEGETATION
Site D2
SCRUB OAK 1
SCRUB OAK 2
LARGE SCRUB OAK
ASSORTED SCRUB BRUSH
HILLSIDE VEGETATION
SANDY SOIL
Apparent Temperature
WED 6 APR 94
Site D1
Site D2
Apparent Temp Deg C
129
130
1332
135
136

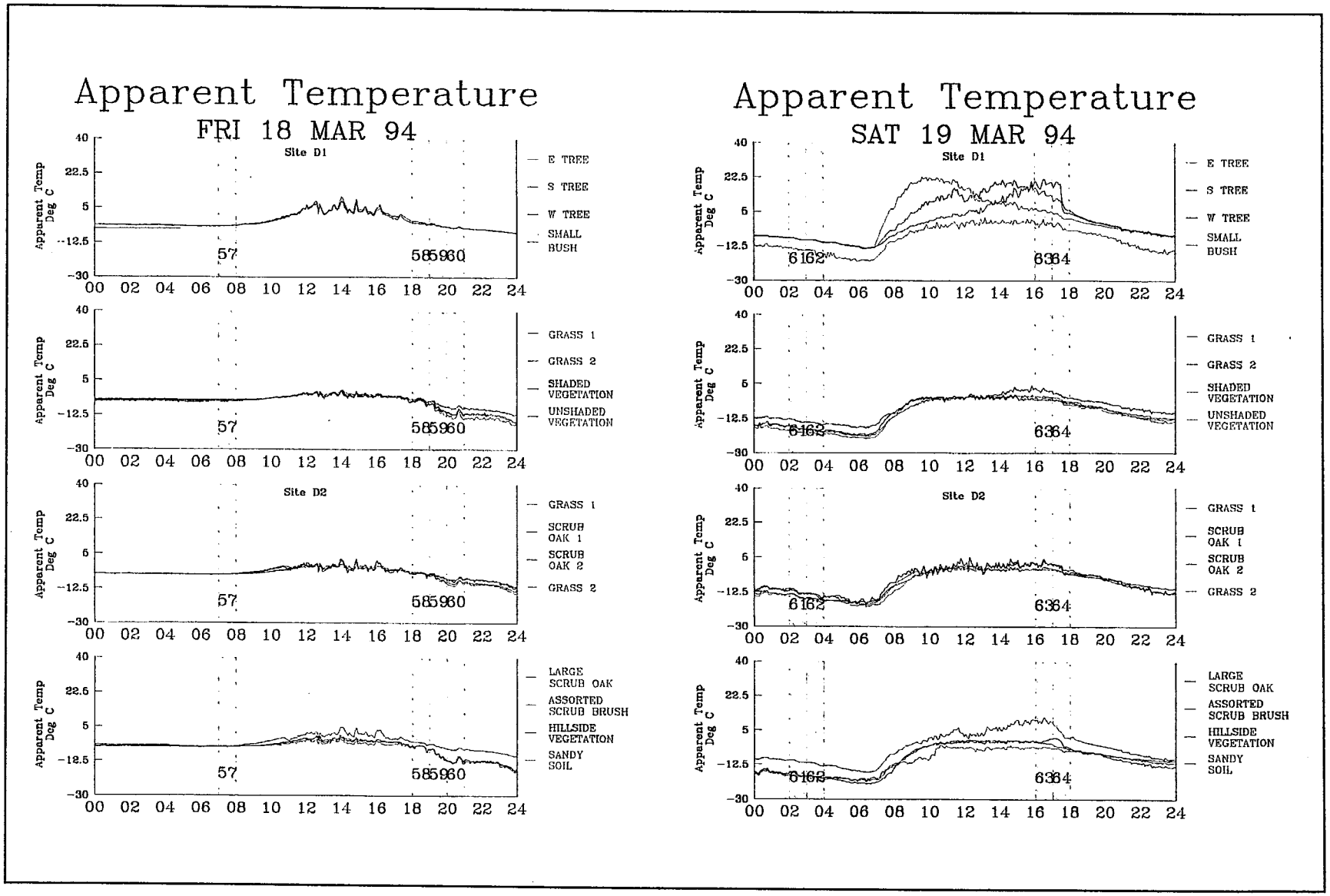

Apparent Temperature
THUR 24 MAR 94
Site D1
E TREE
S TREE
W TREE
SMALL BUSH
GRASS 1
GRASS 2
SHADED VEGETATION
UNSHADED VEGETATION
Site D2
SCRUB OAK 1
SCRUB OAK 2
LARGE SCRUB OAK
ASSORTED SCRUB BRUSH
HILLSIDE VEGETATION
SANDY SOIL
Apparent Temperature
FRI 25 MAR 94
Apparent Temp Deg C
40
22.5
5
-12.5
-30
00 02 04 06 08 10 12 14 16 18 20 22 24
81 82 83 84 85 86 87 88

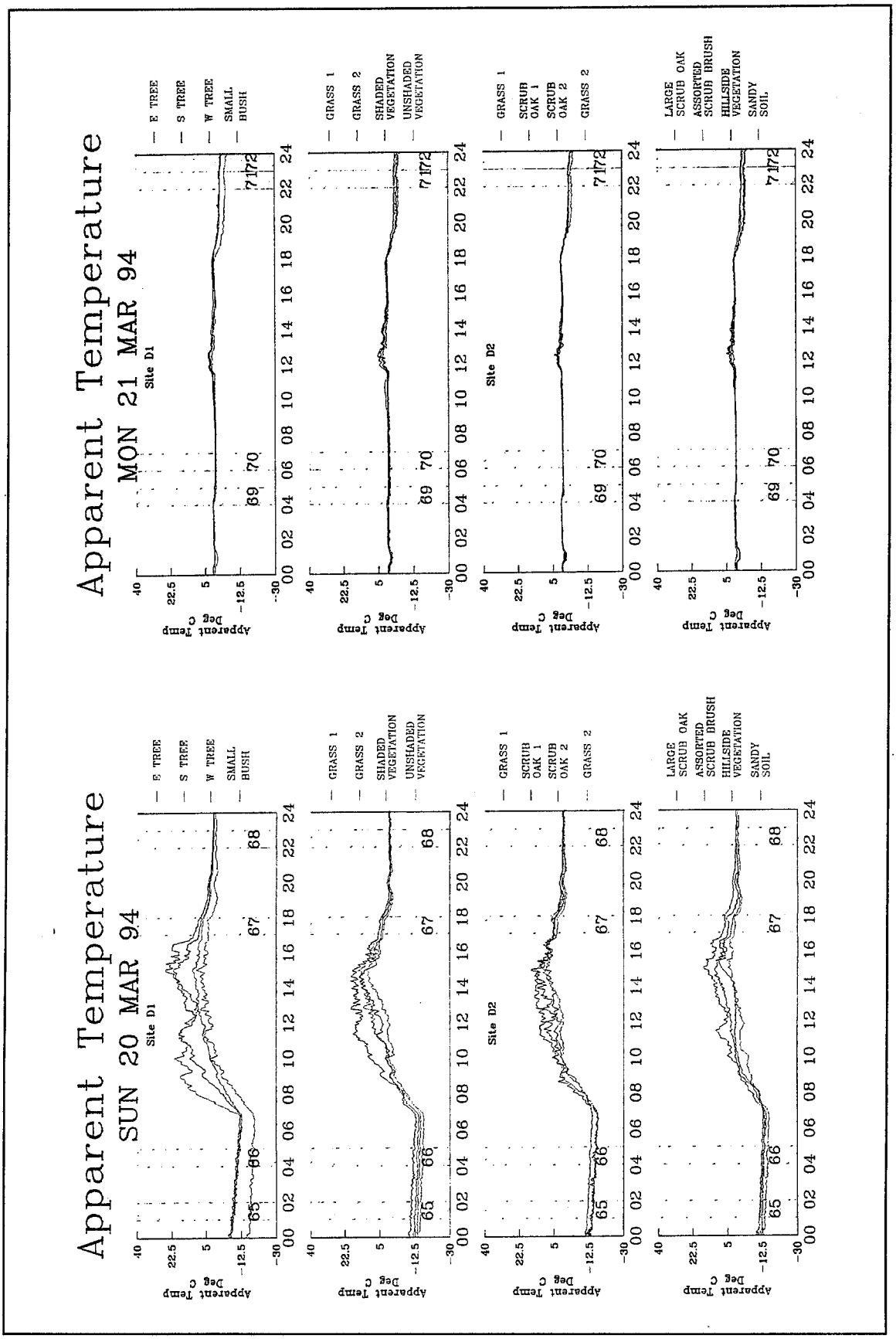

Apparent Temperature
SAT 26 MAR 94
Site D1
Site D2
Apparent Temperature
SUN 27 MAR 94
Site D1
Site D2
E TREE
S TREE
W TREE
SMALL BUSH
GRASS 1
GRASS 2
SHADED VEGETATION
UNSHADED VEGETATION
SCRUB OAK 1
SCRUB OAK 2
LARGE SCRUB OAK
ASSORTED SCRUB BRUSH
HILLSIDE VEGETATION
SANDY SOIL
Apparent Temp Deg C

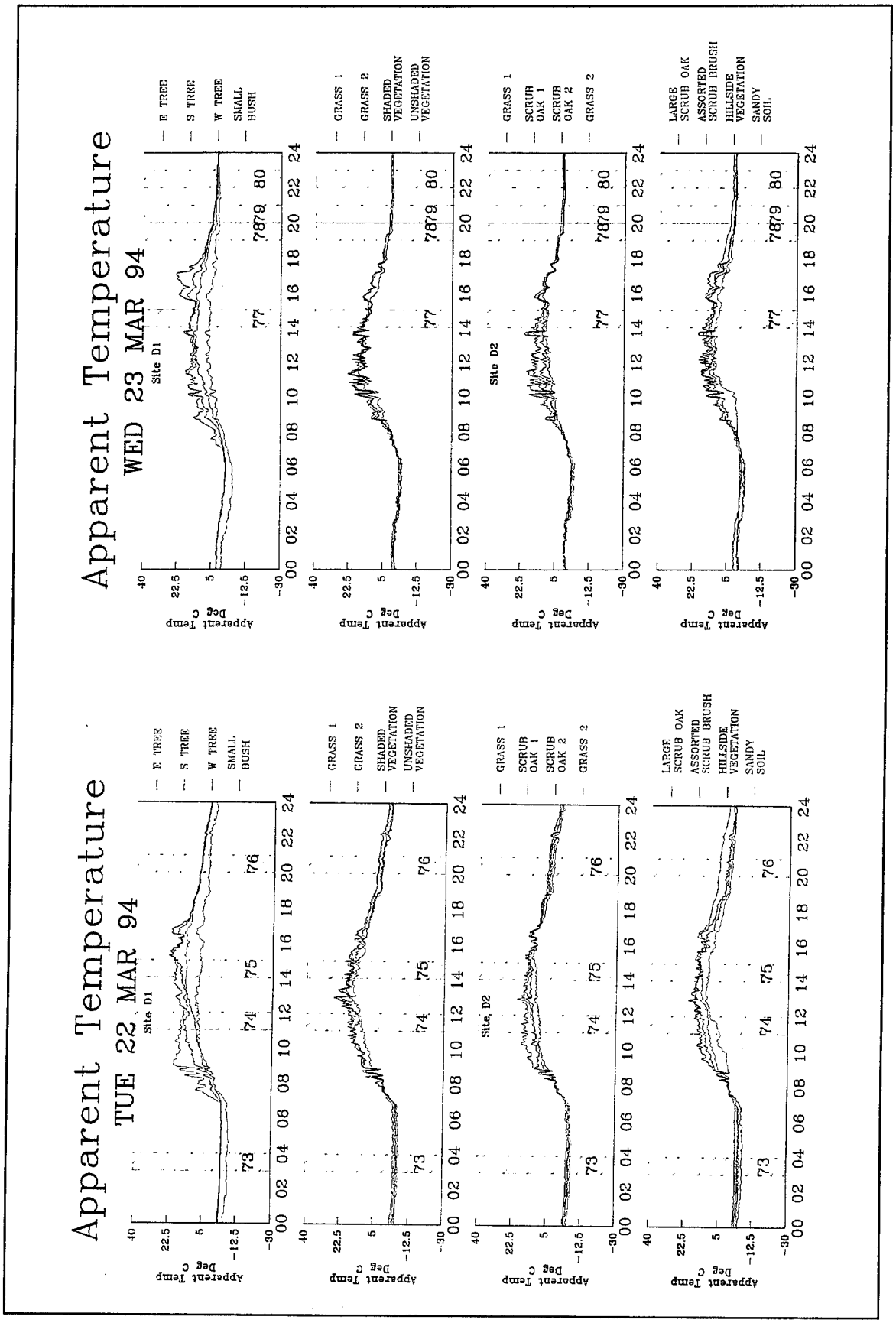

Apparent Temperature
MON 28 MAR 94
Site D1
Apparent Temp Deg C
E TREE
S TREE
W TREE
SMALL BUSH
97
98
99
100
GRASS 1
GRASS 2
SHADED VEGETATION
UNSHADED VEGETATION
Site D2
SCRUB OAK 1
SCRUB OAK 2
LARGE SCRUB OAK
ASSORTED SCRUB BRUSH
HILLSIDE VEGETATION
SANDY SOIL
00 02 04 06 08 10 12 14 16 18 20 22 24

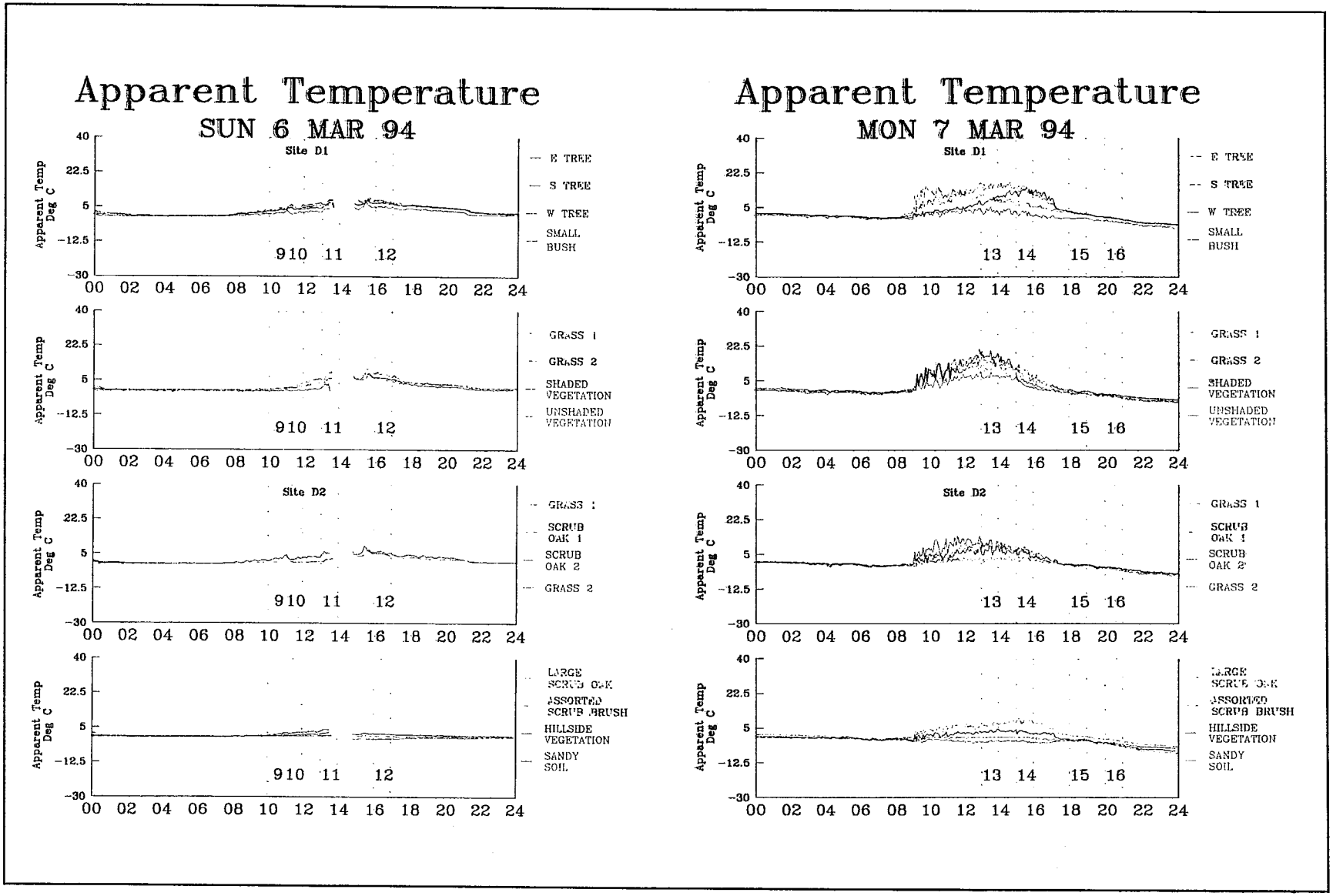

Apparent Temperature
TUE 29 MAR 94
Site D1
Apparent Temp Deg C
E TREE
S TREE
W TREE
SMALL BUSH
101
102
03
104
GRASS 1
GRASS 2
SHADED VEGETATION
UNSHADED VEGETATION
Site D2
SCRUB OAK 1
SCRUB OAK 2
LARGE SCRUB OAK
ASSORTED SCRUB BRUSH
HILLSIDE VEGETATION
SANDY SOIL
00 02 04 06 08 10 12 14 16 18 20 22 24

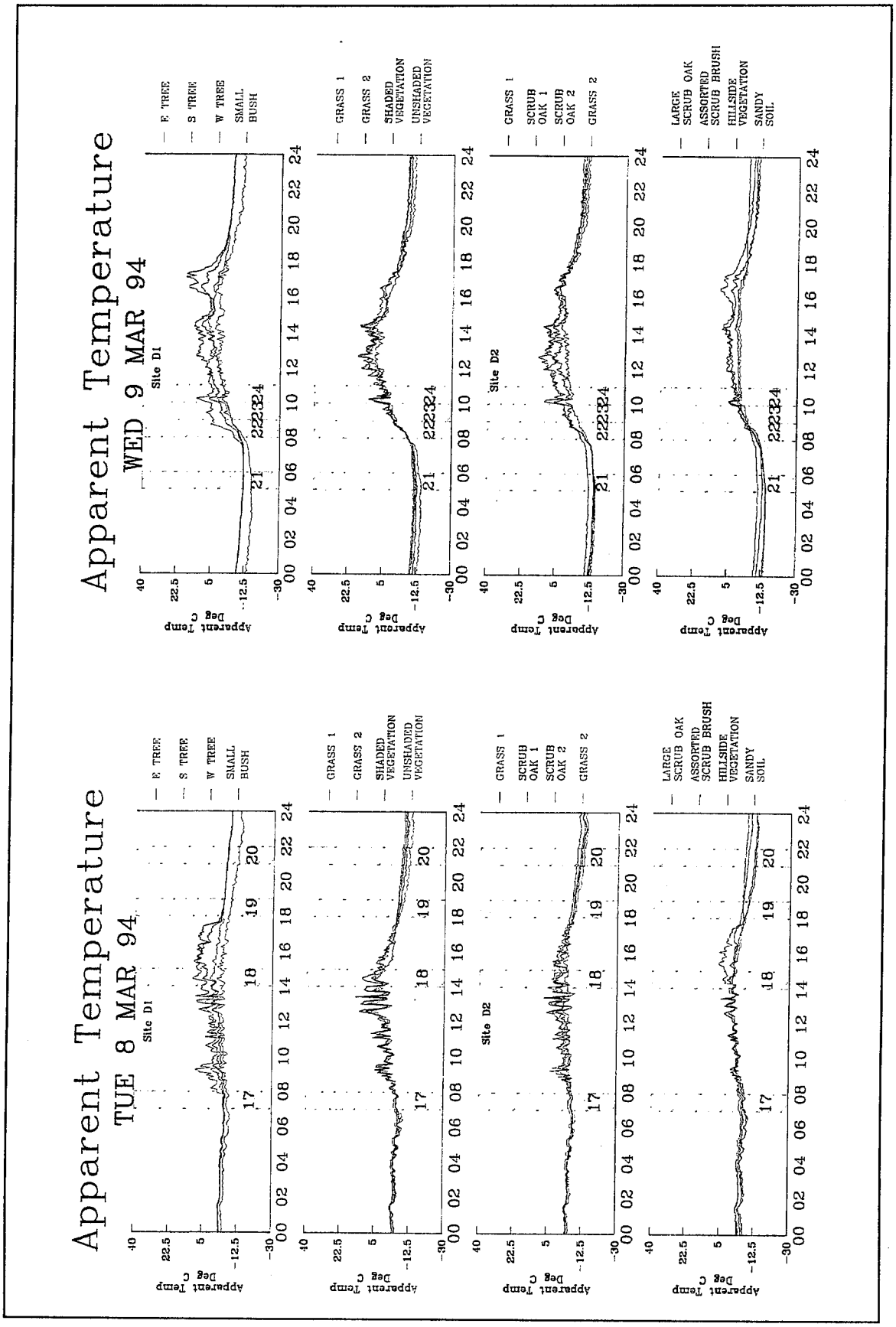

Apparent Temperature
WED 30 MAR 94
Site D1
Site D2
E TREE
S TREE
W TREE
SMALL BUSH
GRASS 1
GRASS 2
SHADED VEGETATION
UNSHADED VEGETATION
SCRUB OAK 1
SCRUB OAK 2
LARGE SCRUB OAK
ASSORTED SCRUB BRUSH
HILLSIDE VEGETATION
SANDY SOIL
Apparent Temp Deg C
105
106
107
108
Apparent Temperature
THUR 31 MAR 94
Site D1
Site D2
109
110
111
112

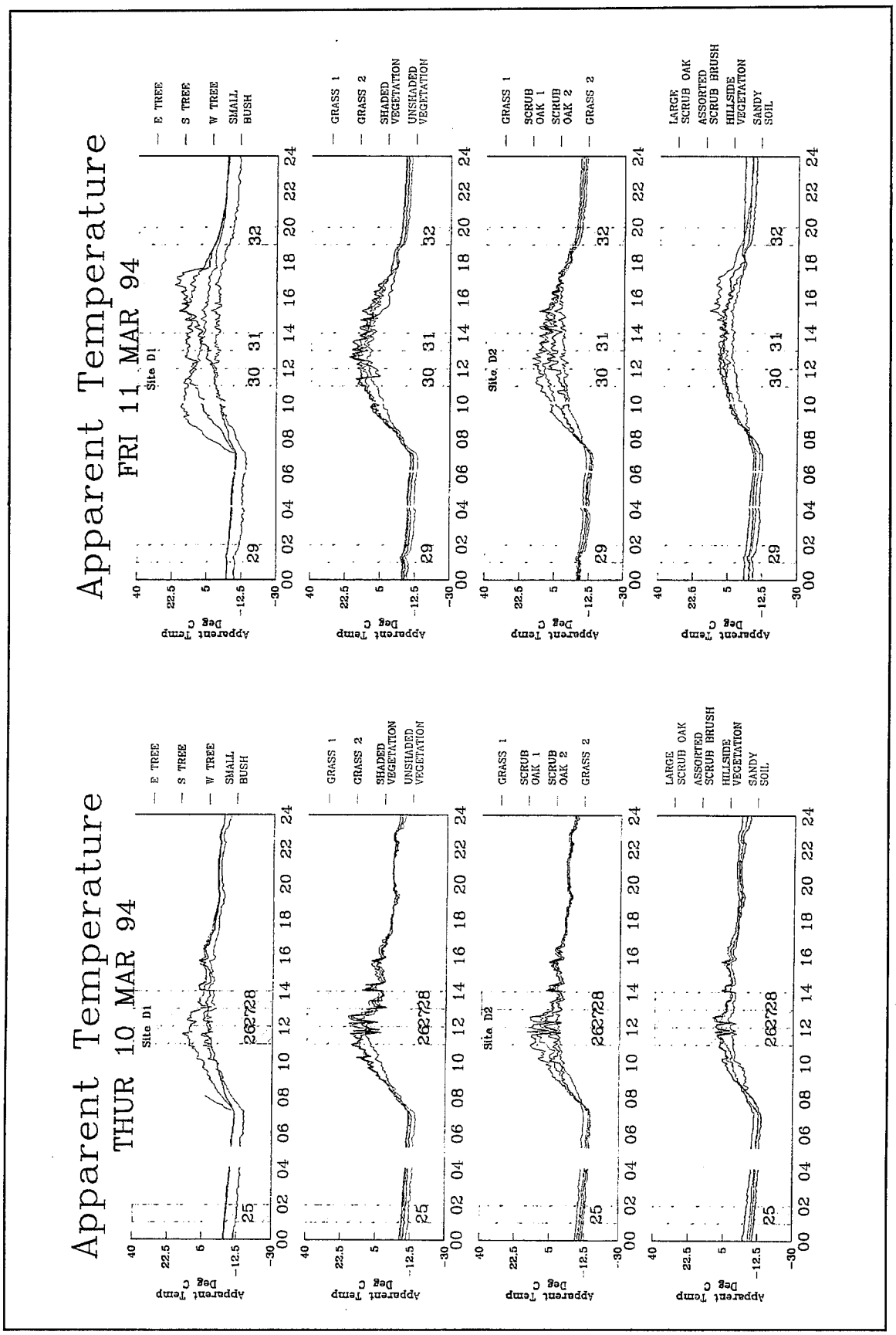

Apparent Temperature
FRI 18 MAR 94
Site D1
E TREE
S TREE
W TREE
SMALL BUSH
GRASS 1
GRASS 2
SHADED VEGETATION
UNSHADED VEGETATION
Site D2
GRASS 1
SCRUB OAK 1
SCRUB OAK 2
GRASS 2
LARGE SCRUB OAK
ASSORTED SCRUB BRUSH
HILLSIDE VEGETATION
SANDY SOIL
Apparent Temp Deg C
40
22.5
5
-12.5
-30
00 02 04 06 08 10 12 14 16 18 20 22 24
57
585960
Apparent Temperature
SAT 19 MAR 94
6162
6364

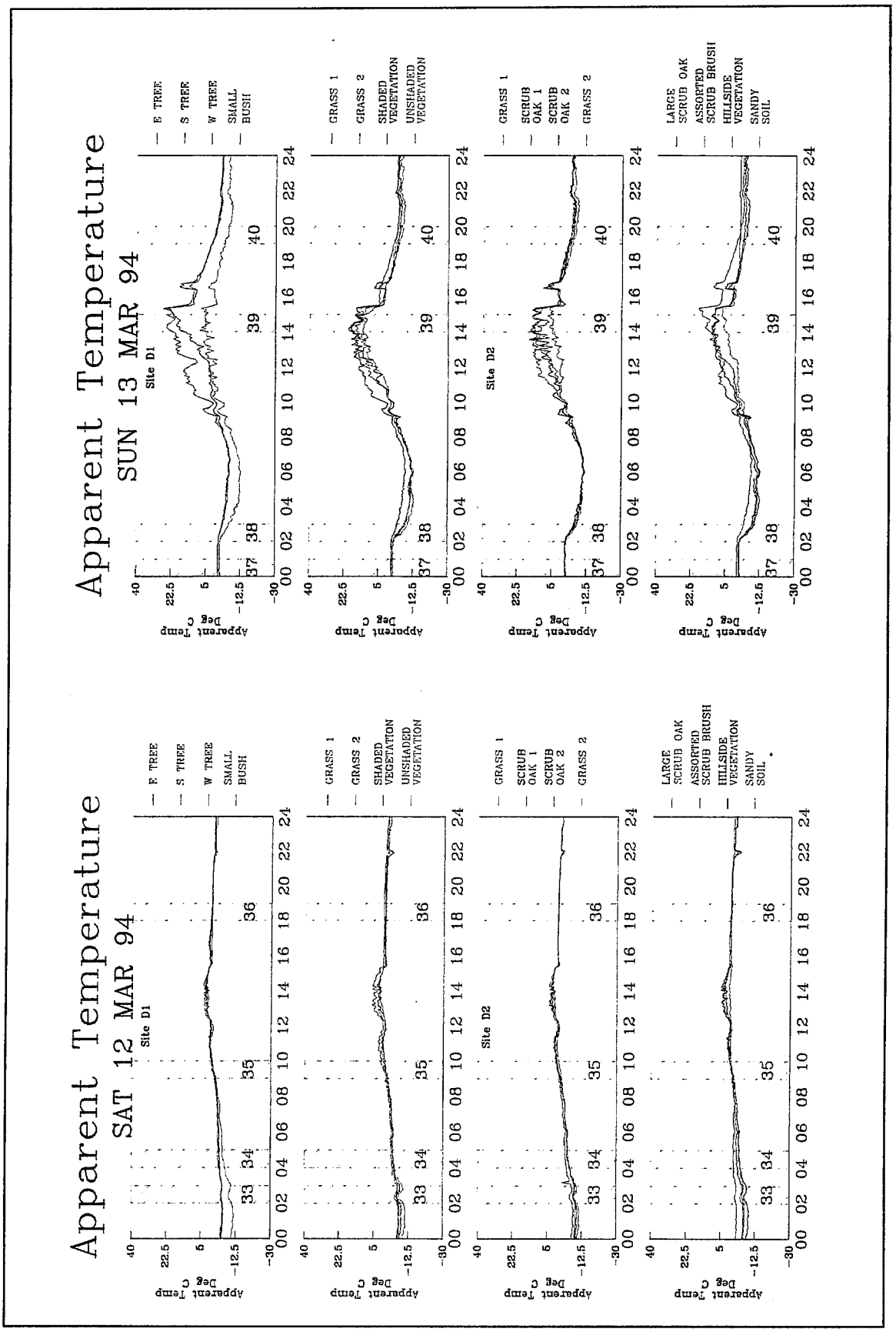

Apparent Temperature
SUN 20 MAR 94
Site D1
Site D2
Apparent Temperature
MON 21 MAR 94
Site D1
Site D2
Apparent Temp Deg C
E TREE
S TREE
W TREE
SMALL BUSH
GRASS 1
GRASS 2
SHADED VEGETATION
UNSHADED VEGETATION
SCRUB OAK 1
SCRUB OAK 2
LARGE SCRUB OAK
ASSORTED SCRUB BRUSH
HILLSIDE VEGETATION
SANDY SOIL

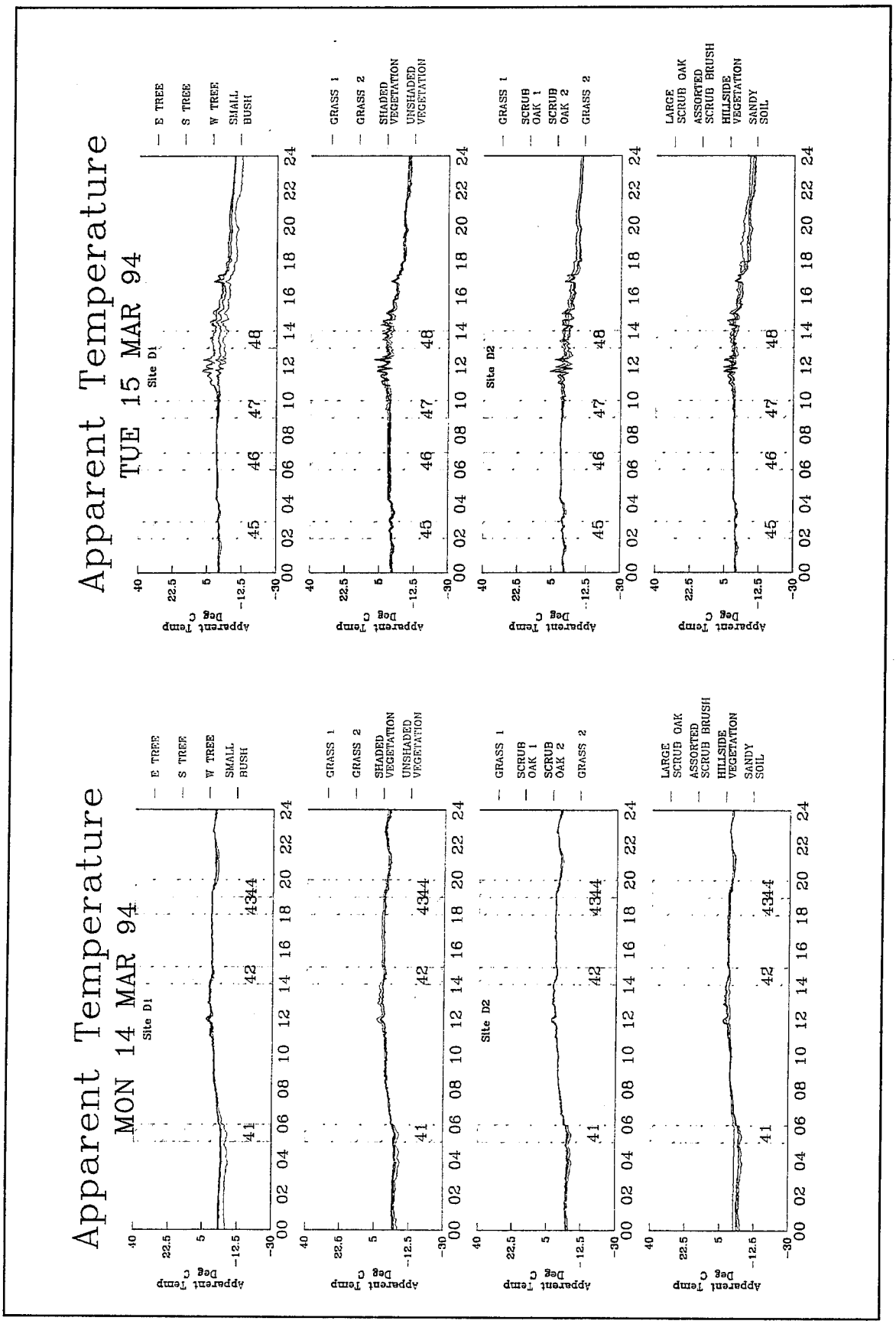

Apparent Temperature
TUE 22 MAR 94
Site D1
E TREE
S TREE
W TREE
SMALL BUSH
GRASS 1
GRASS 2
SHADED VEGETATION
UNSHADED VEGETATION
Site, D2
SCRUB OAK 1
SCRUB OAK 2
LARGE SCRUB OAK
ASSORTED SCRUB BRUSH
HILLSIDE VEGETATION
SANDY SOIL
Apparent Temperature
WED 23 MAR 94
Site D1
Site D2
Apparent Temp Deg C
40
22.5
5
-12.5
-30
00 02 04 06 08 10 12 14 16 18 20 22 24
73 74 75 76 77 78 79 80

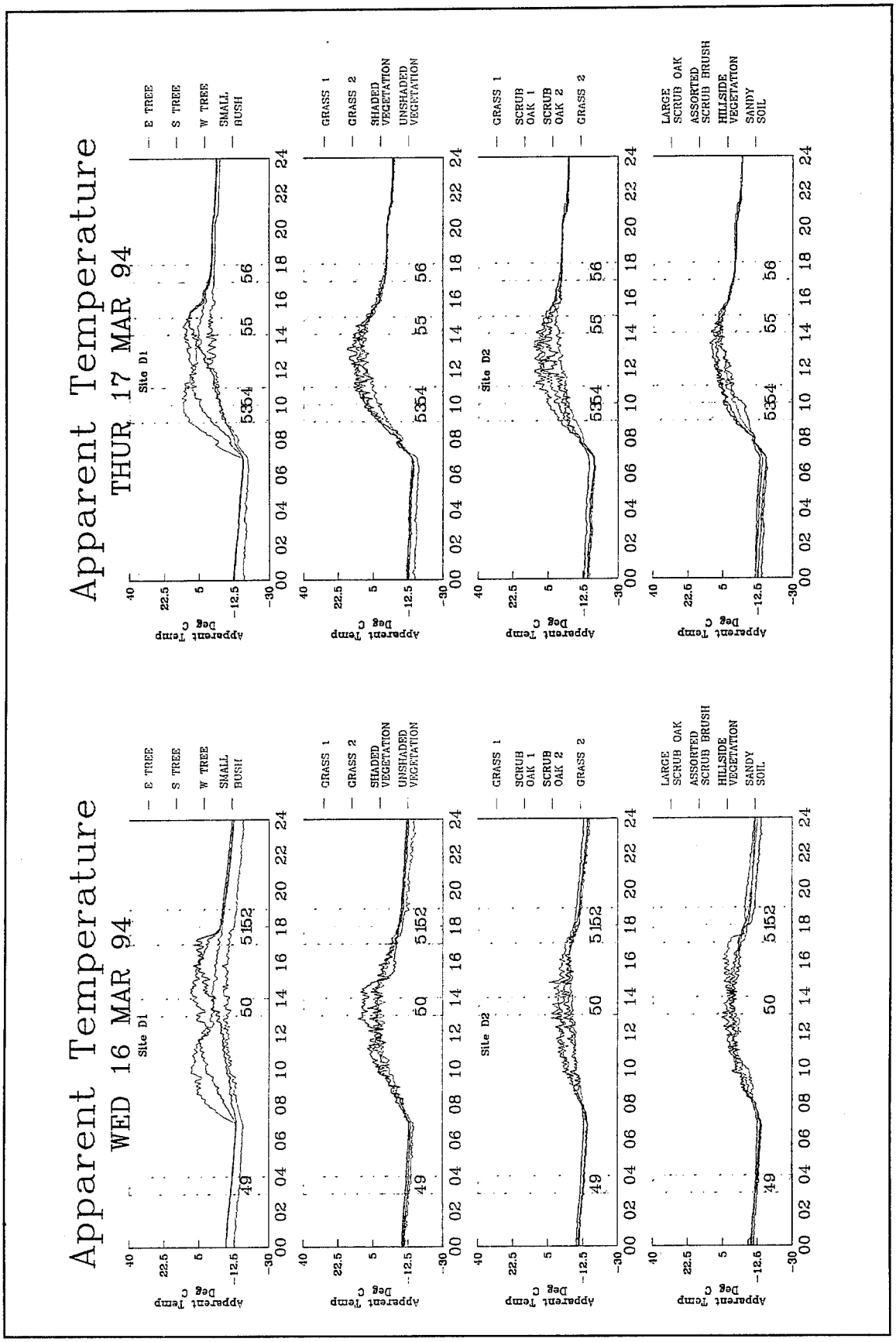

Apparent Temperature
SUN 6 MAR 94
Site D1
Apparent Temp Deg C
40
22.5
5
-12.5
-30
9 10 11 12
00 02 04 06 08 10 12 14 16 18 20 22 24
E TREE
S TREE
W TREE
SMALL BUSH
GRASS 1
GRASS 2
SHADED VEGETATION
UNSHADED VEGETATION
Site D2
SCRUB OAK 1
SCRUB OAK 2
LARGE SCRUB OAK
ASSORTED SCRUB BRUSH
HILLSIDE VEGETATION
SANDY SOIL
Apparent Temperature
MON 7 MAR 94
13 14 15 16

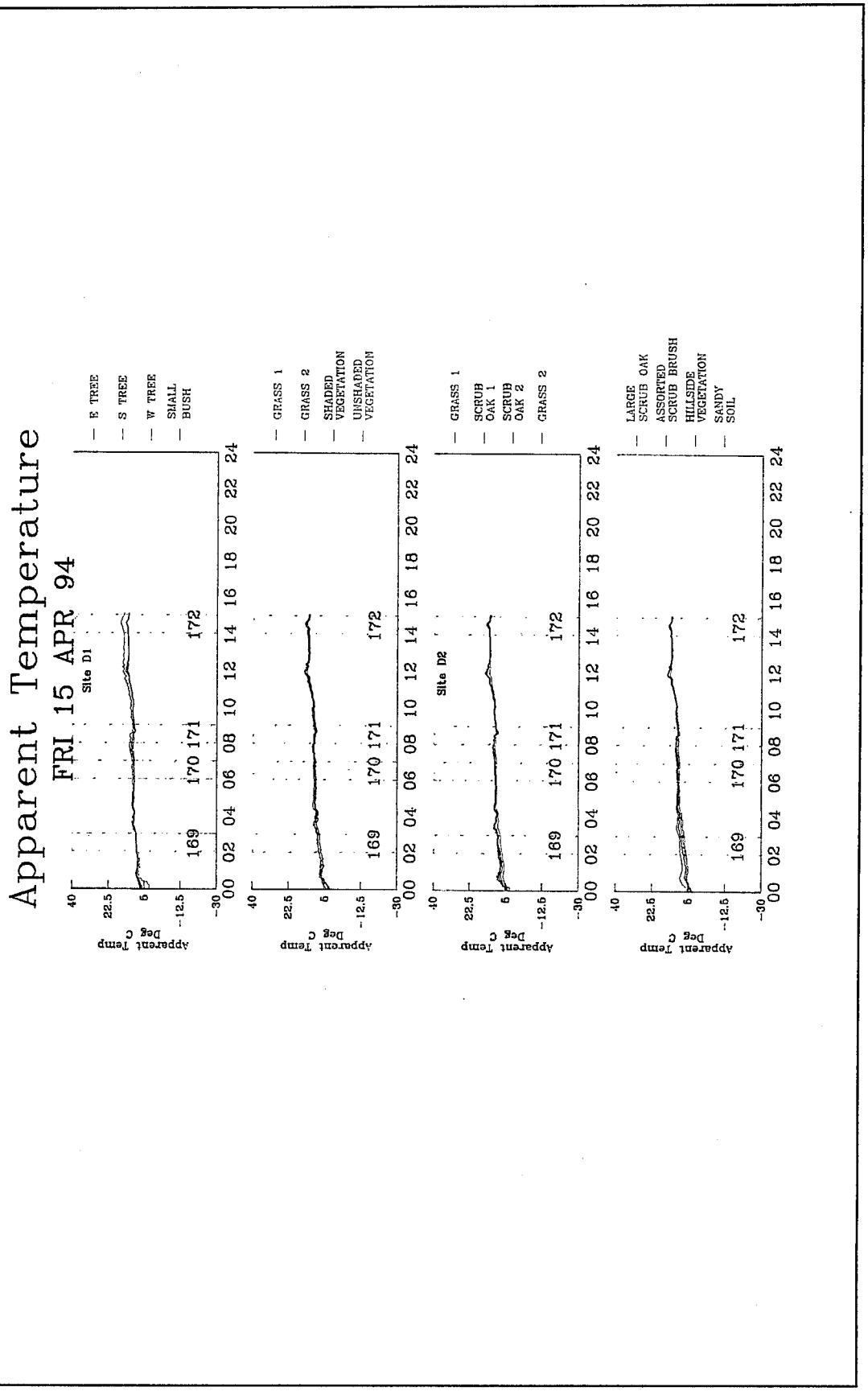

Apparent Temperature
TUE 8 MAR 94
Site D1
E TREE
S TREE
W TREE
SMALL BUSH
GRASS 1
GRASS 2
SHADED VEGETATION
UNSHADED VEGETATION
Site D2
SCRUB OAK 1
SCRUB OAK 2
LARGE SCRUB OAK
ASSORTED SCRUB BRUSH
HILLSIDE VEGETATION
SANDY SOIL
Apparent Temperature
WED 9 MAR 94
Site D1
Site D2
Apparent Temp Deg C


Apparent Temperature
FRI 11 MAR 94
Site D1
E TREE
S TREE
W TREE
SMALL BUSH
GRASS 1
GRASS 2
SHADED VEGETATION
UNSHADED VEGETATION
Site D2
SCRUB OAK 1
SCRUB OAK 2
LARGE SCRUB OAK
ASSORTED SCRUB BRUSH
HILLSIDE VEGETATION
SANDY SOIL
Apparent Temperature
THUR 10 MAR 94
Apparent Temp Deg C
29
30
31
32
25
26
27
28


Apparent Temperature
SAT 12 MAR 94
Site D1
E TREE
S TREE
W TREE
SMALL BUSH
GRASS 1
GRASS 2
SHADED VEGETATION
UNSHADED VEGETATION
Site D2
SCRUB OAK 1
SCRUB OAK 2
LARGE SCRUB OAK
ASSORTED SCRUB BRUSH
HILLSIDE VEGETATION
SANDY SOIL
Apparent Temperature
SUN 13 MAR 94
Site D1
Site D2
Apparent Temp Deg C


Apparent Temperature
MON 14 MAR 94
Site D1
Site D2
Apparent Temperature
TUE 15 MAR 94
Site D1
Site D2
Deg C
E TREE
S TREE
W TREE
SMALL BUSH
GRASS 1
GRASS 2
SHADED VEGETATION
UNSHADED VEGETATION
SCRUB OAK 1
SCRUB OAK 2
LARGE SCRUB OAK
ASSORTED SCRUB BRUSH
HILLSIDE VEGETATION
SANDY SOIL

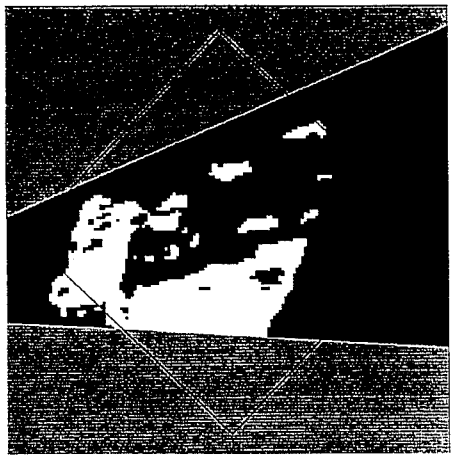

Apparent Temperature
WED 16 MAR 94
Site D1
E TREE
S TREE
W TREE
SMALL BUSH
GRASS 1
GRASS 2
SHADED VEGETATION
UNSHADED VEGETATION
Site D2
SCRUB OAK 1
SCRUB OAK 2
LARGE SCRUB OAK
ASSORTED SCRUB BRUSH
HILLSIDE VEGETATION
SANDY SOIL
Apparent Temperature
THUR 17 MAR 94
Site D1
Site D2
Apparent Temp Deg C
40
22.5
5
-12.5
-30
00 02 04 06 08 10 12 14 16 18 20 22 24
49
50
51
52
53
54
55
56


Apparent Temperature
FRI 15 APR 94
Site D1
Site D2
Apparent Temp Deg C
E TREE
S TREE
W TREE
SMALL BUSH
GRASS 1
GRASS 2
SHADED VEGETATION
UNSHADED VEGETATION
SCRUB OAK 1
SCRUB OAK 2
LARGE SCRUB OAK
ASSORTED SCRUB BRUSH
HILLSIDE VEGETATION
SANDY SOIL
169
170
171
172
00 02 04 06 08 10 12 14 16 18 20 22 24
40
22.5
6
-12.5
-30

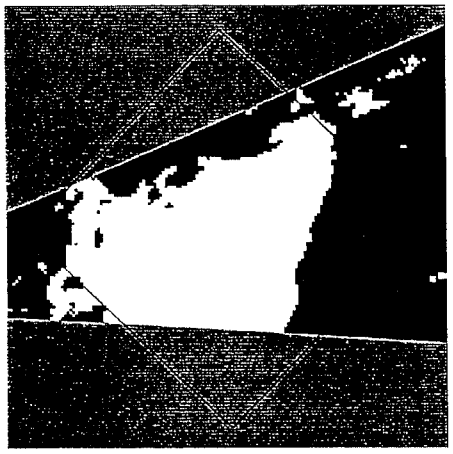
Appendix G
Snow Cover Map Data

The white and black regions represent snow cover and no snow cover, respectively. The gray region represents areas outside the field of view of the CCD camera and was not mapped. The square outline represents the corners and boundary of the main imaging area.

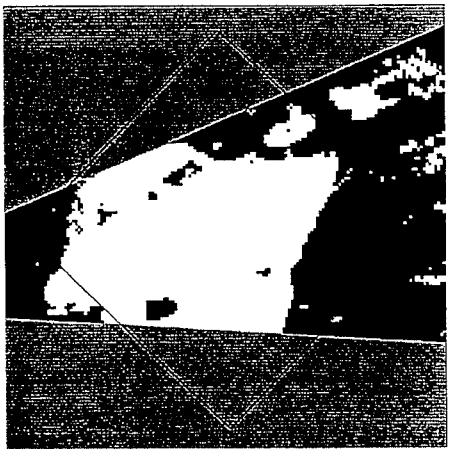
Mission: 047



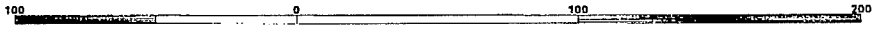
Mission: 048



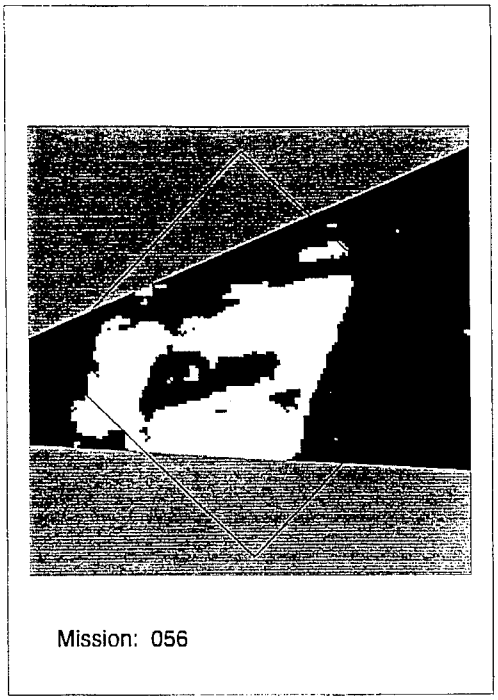
Mission: 050



Mission: 051



Mission: 055



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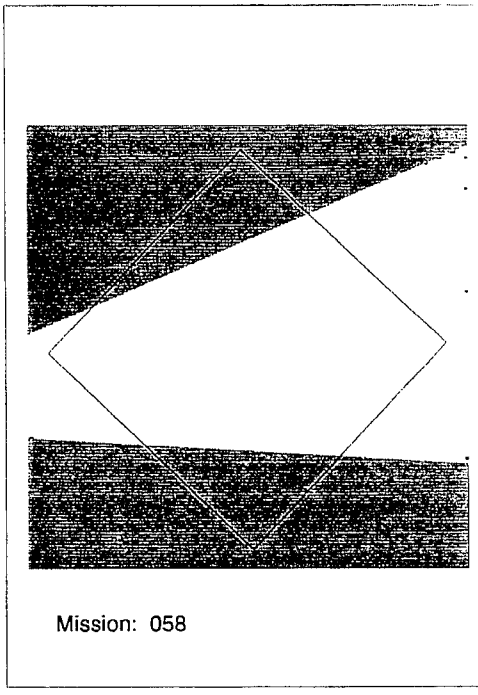

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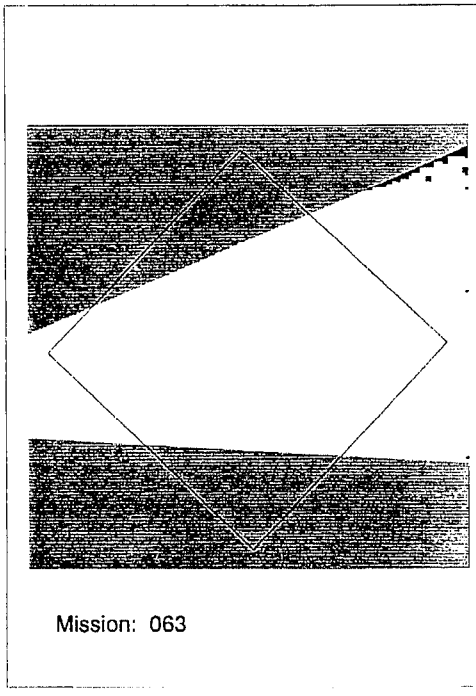

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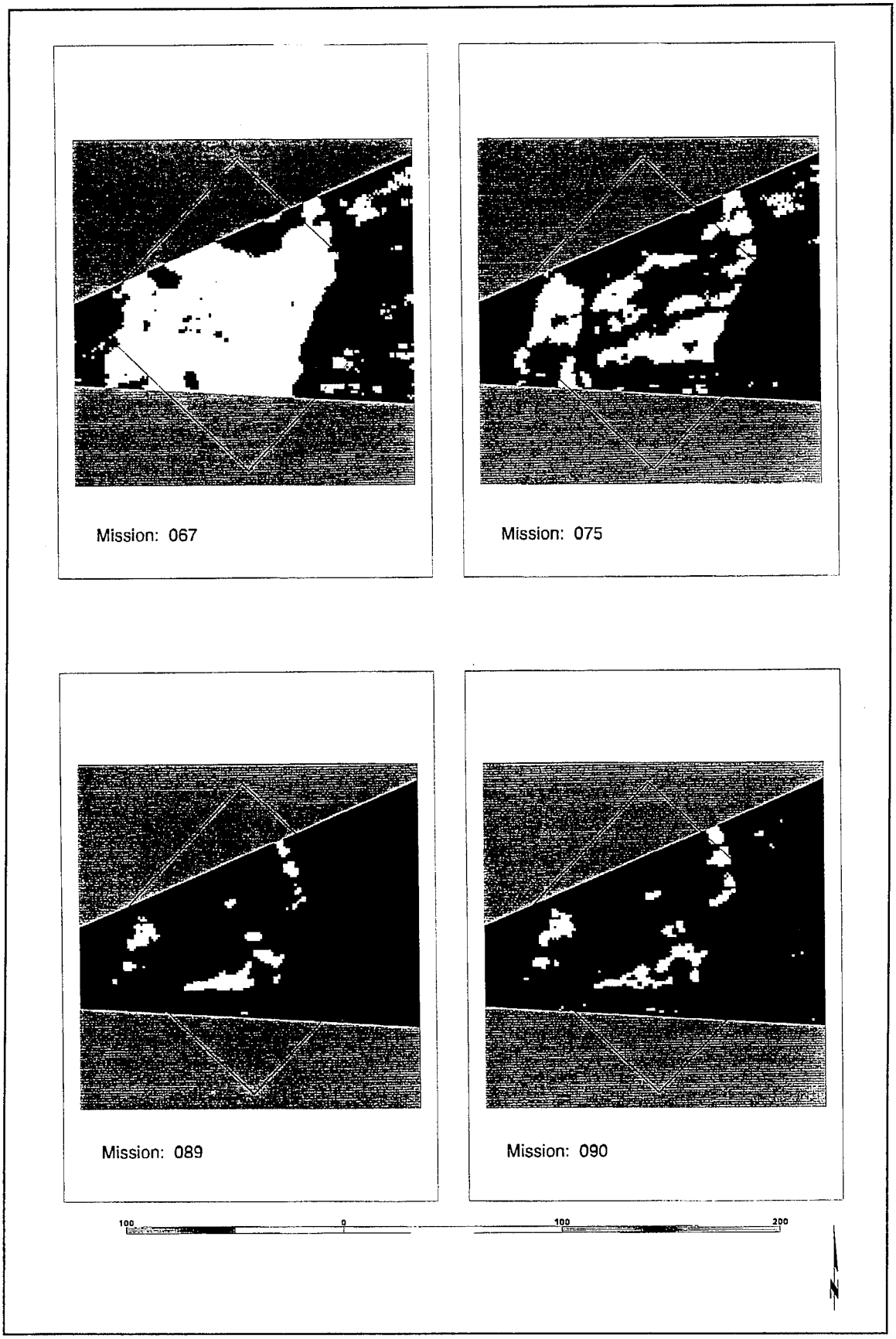
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Mission: 075
Mission: 089
Mission: 090
100
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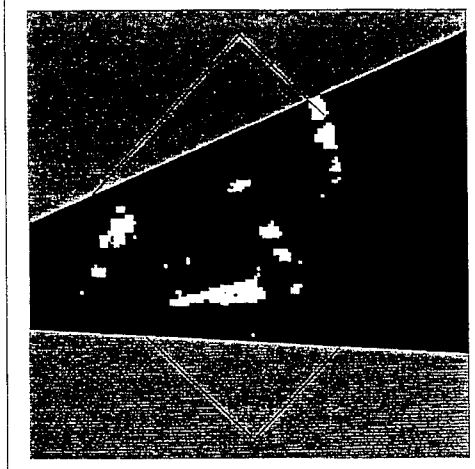
100
200



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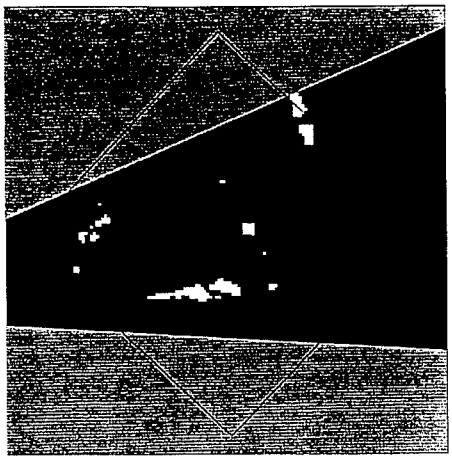

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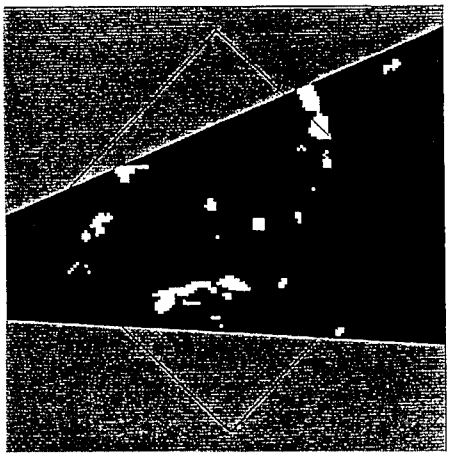

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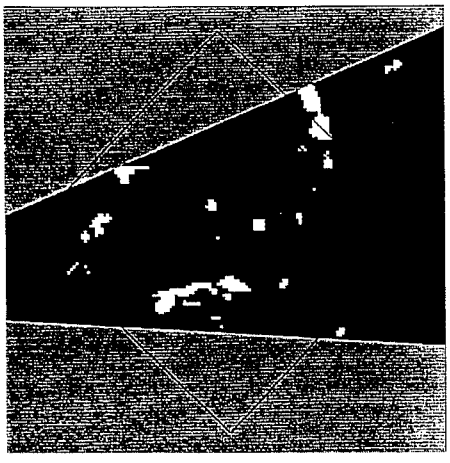

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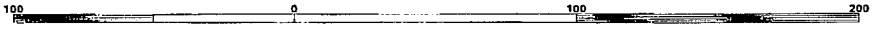

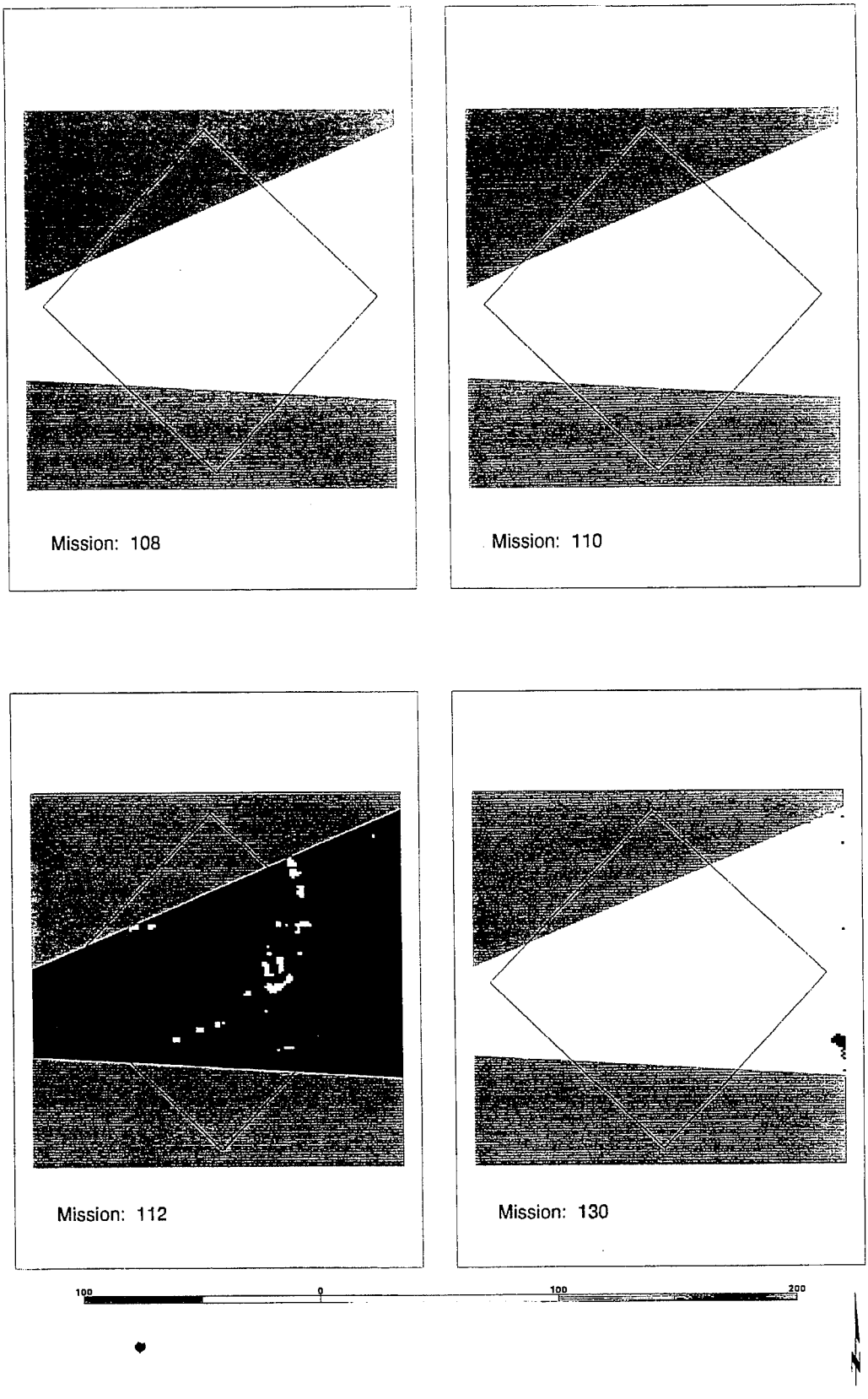
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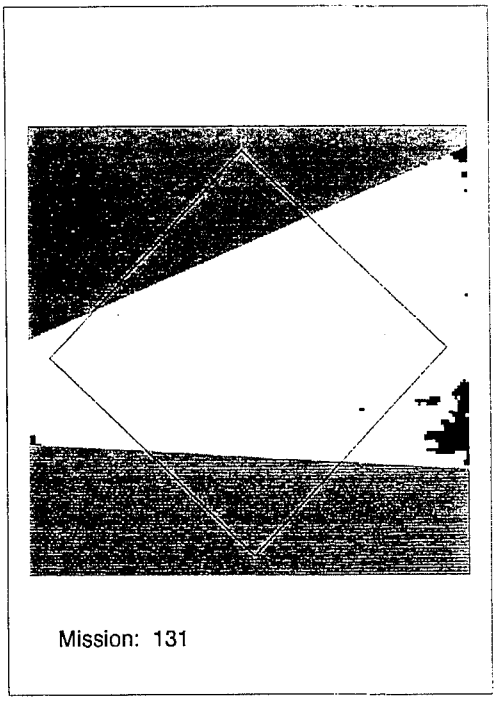
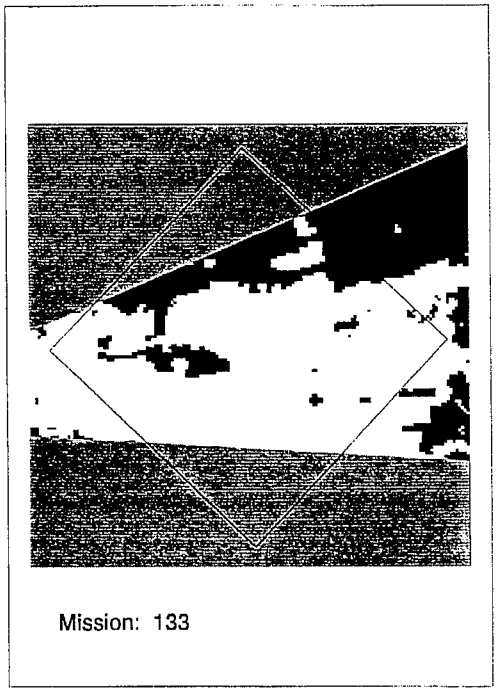
Mission: 112
Mission: 130
100
0
100
200



Mission: 131

Mission: 132



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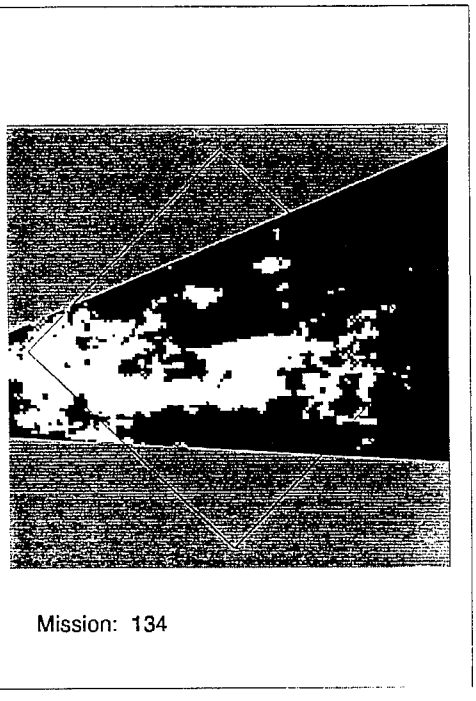

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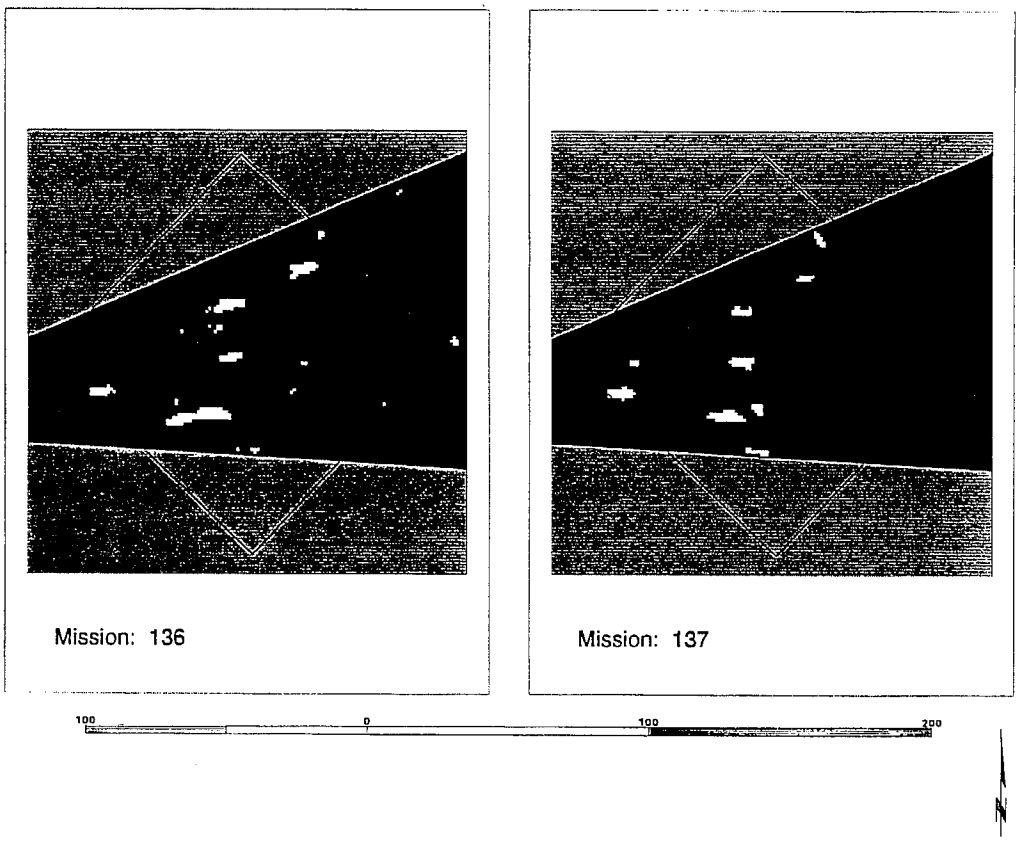
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Mission: 137
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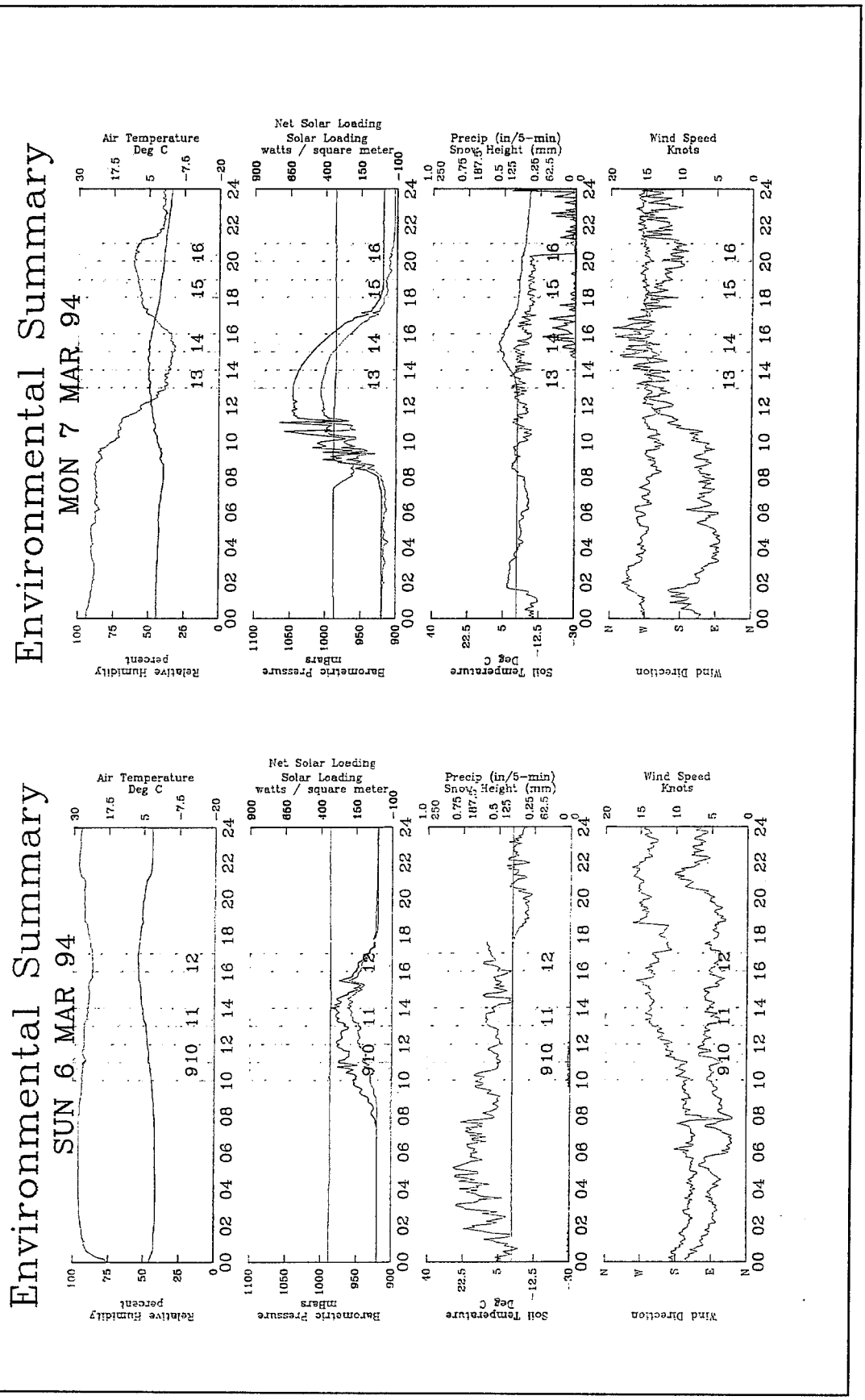
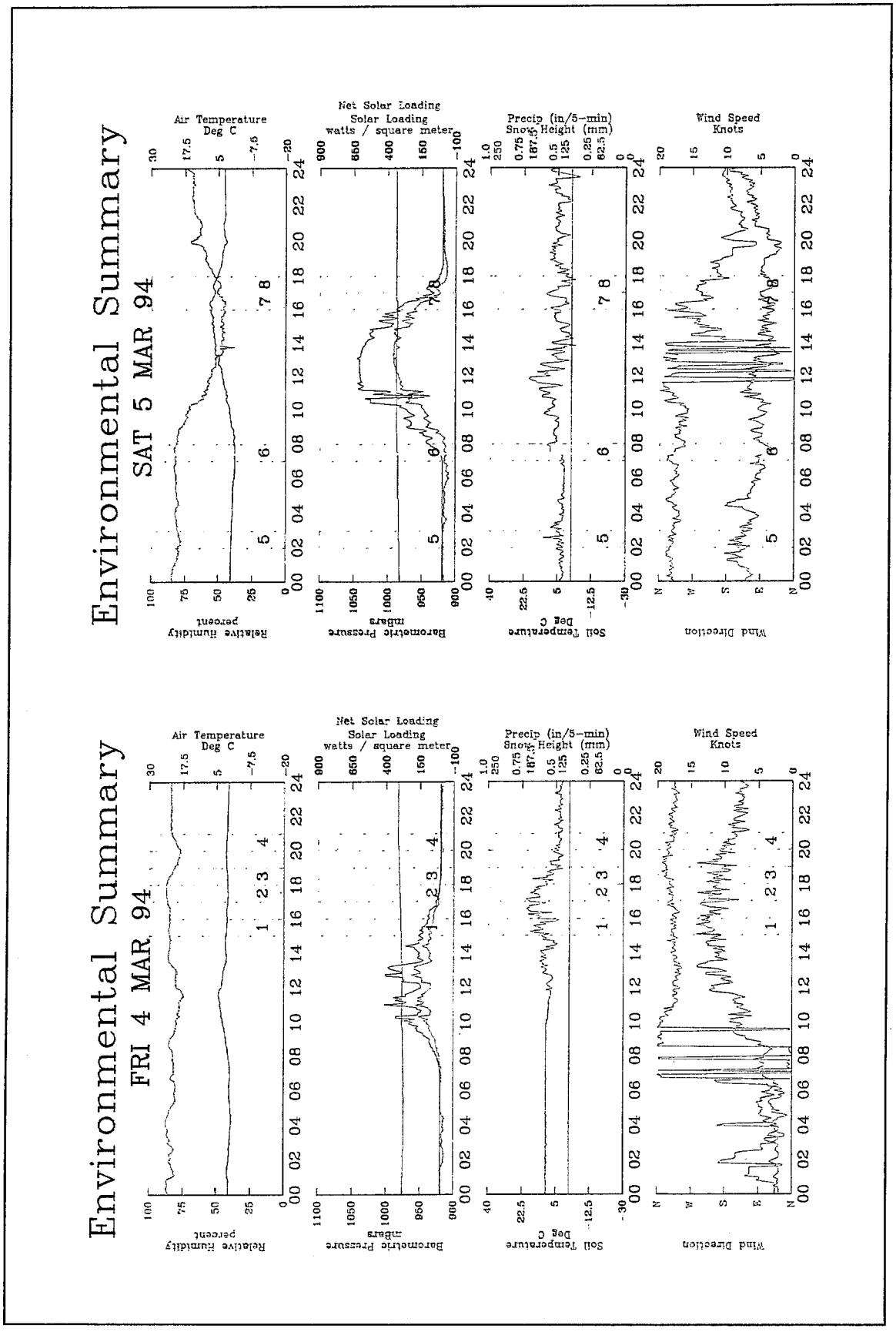
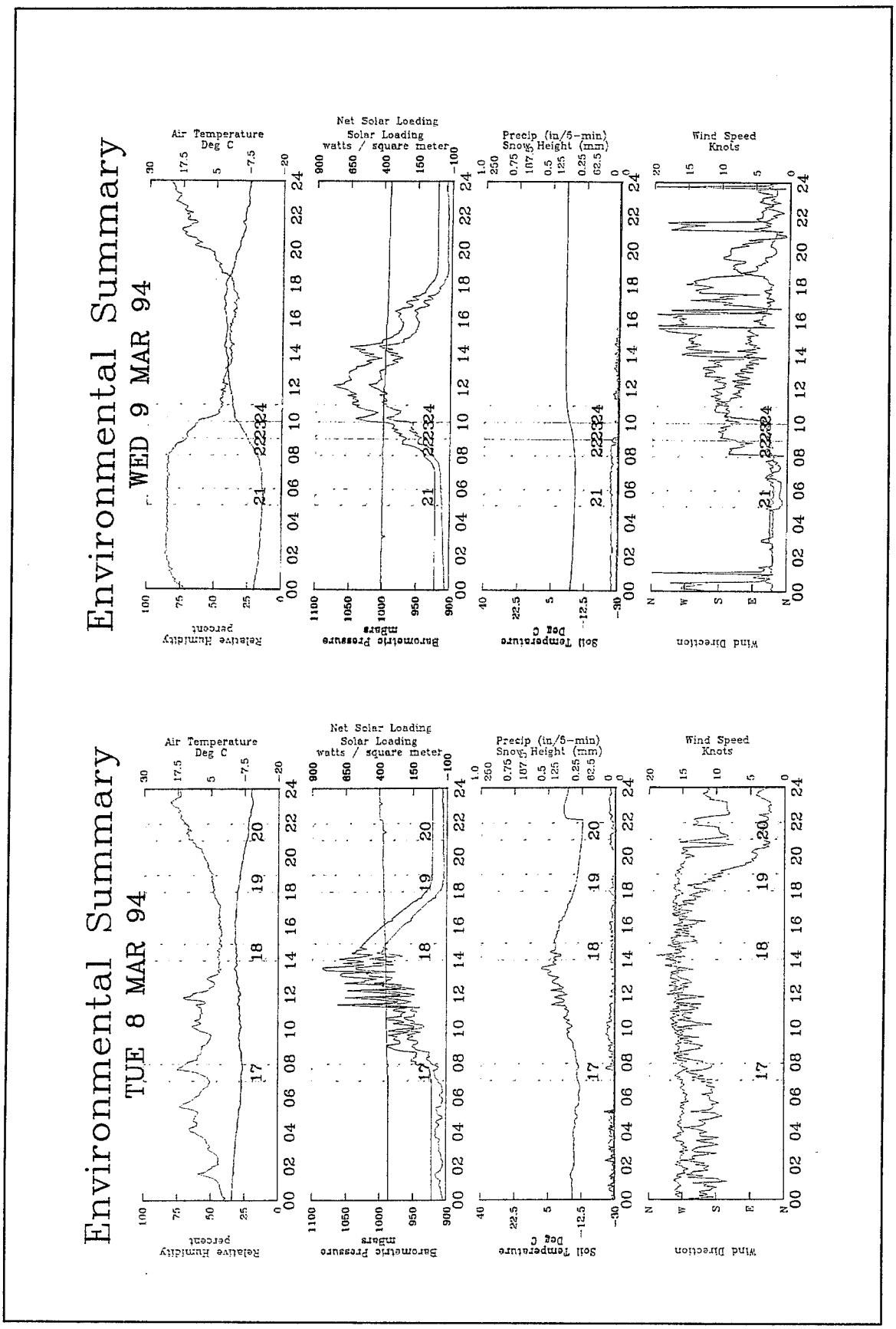
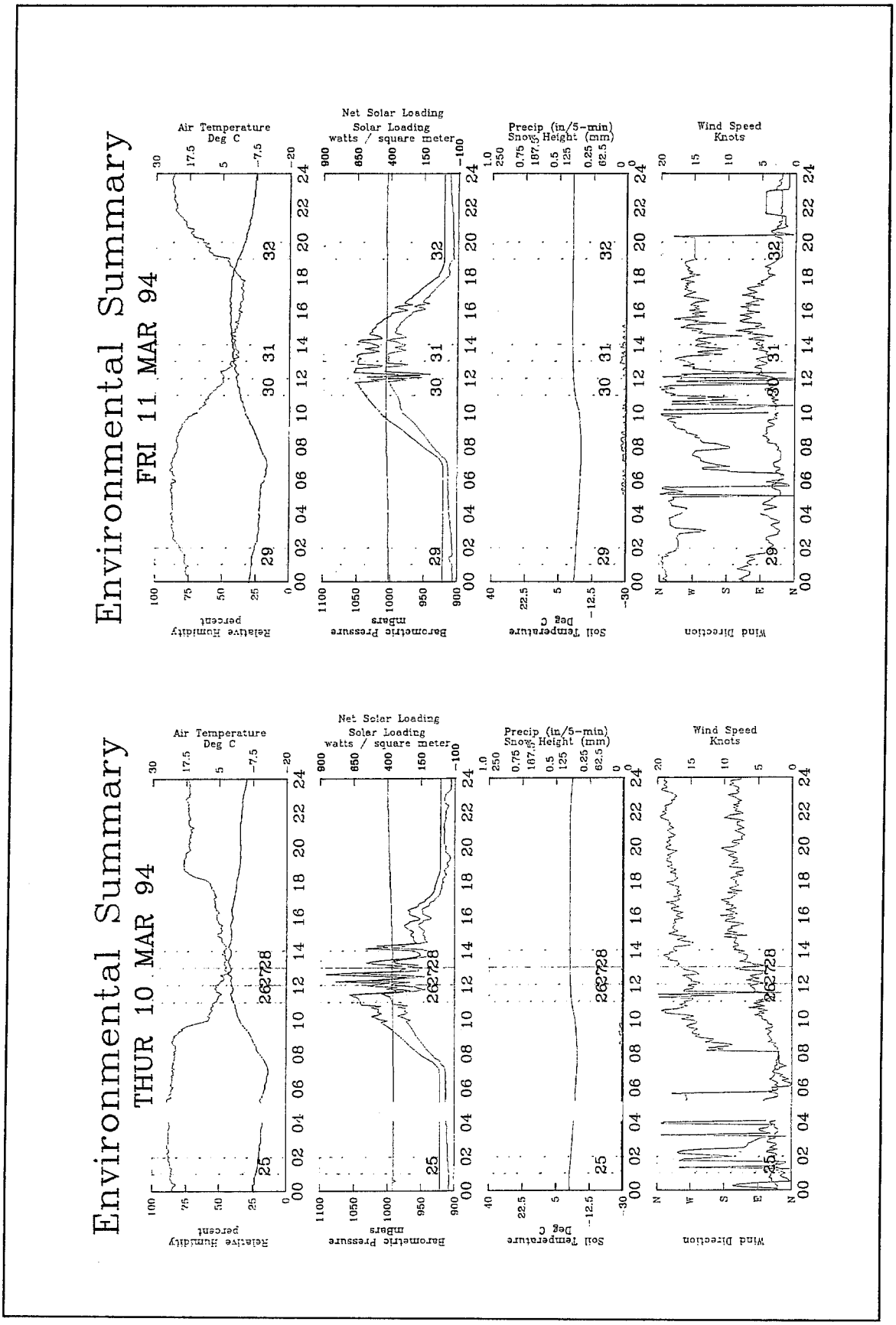
100
200
N

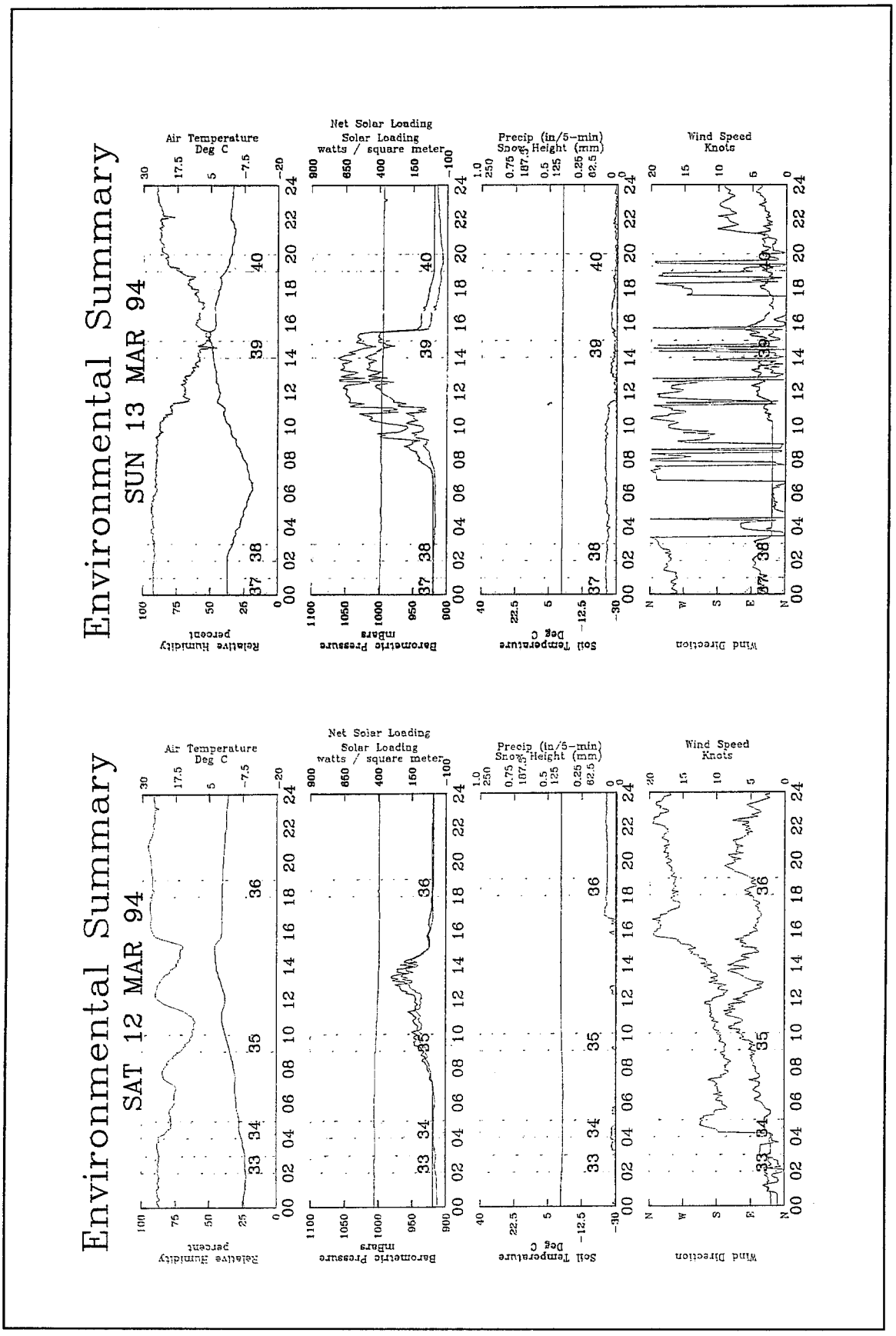
Appendix H
Meteorological Data Summaries

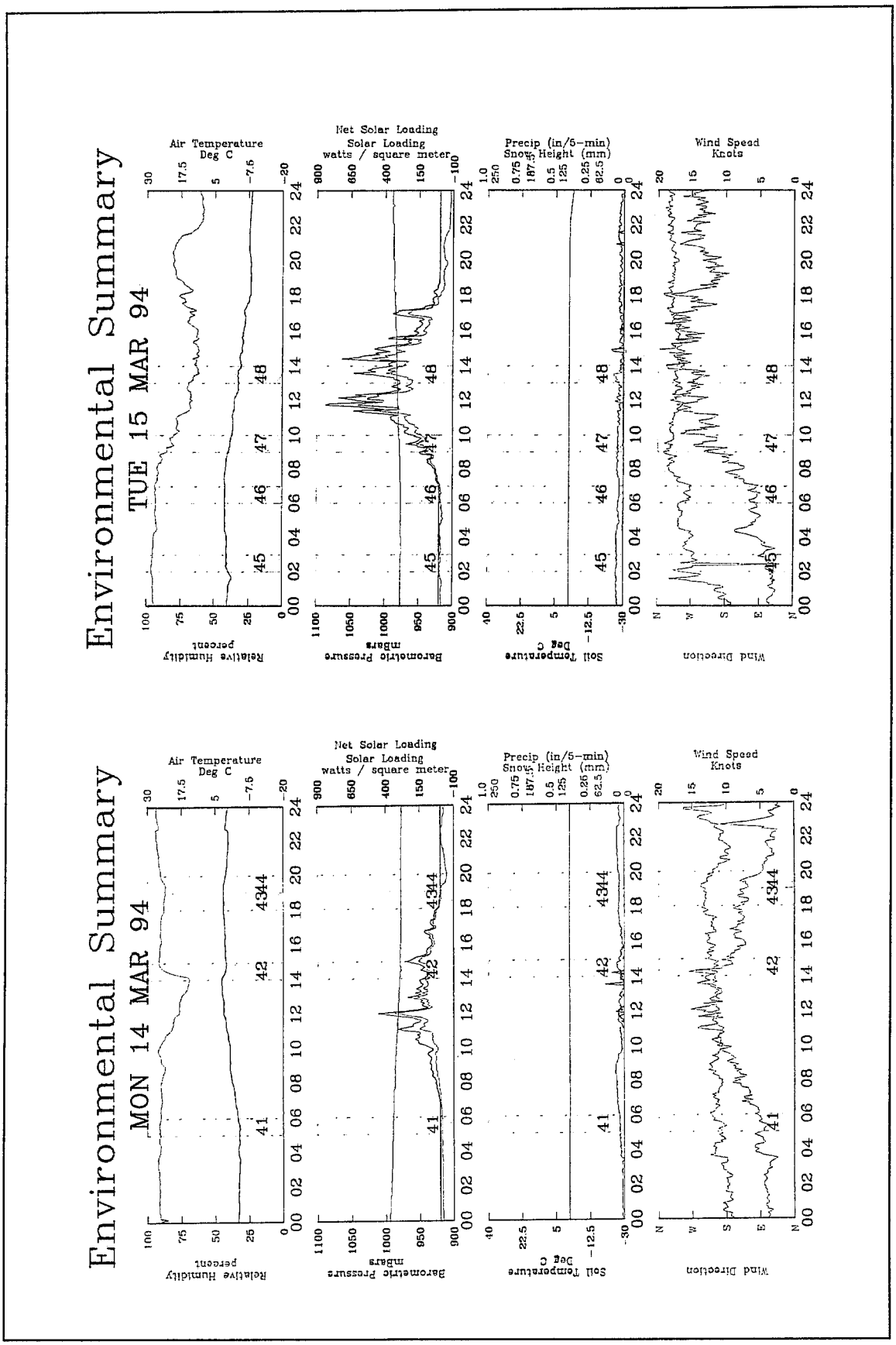

Environmental Summary
MON 7 MAR 94
Air Temperature
Deg C
Relative Humidity
percent
Net Solar Loading
Solar Loading
watts / square meter
Barometric Pressure
mbars
Precip (in/5-min)
Snow Height (mm)
Soil Temperature
Deg C
Wind Speed
Knots
Wind Direction
Environmental Summary
SUN 6 MAR 94
Air Temperature
Deg C
Relative Humidity
percent
Net Solar Loading
Solar Loading
watts / square meter
Barometric Pressure
mbars
Precip (in/5-min)
Snow Height (mm)
Soil Temperature
Deg C
Wind Speed
Knots
Wind Direction

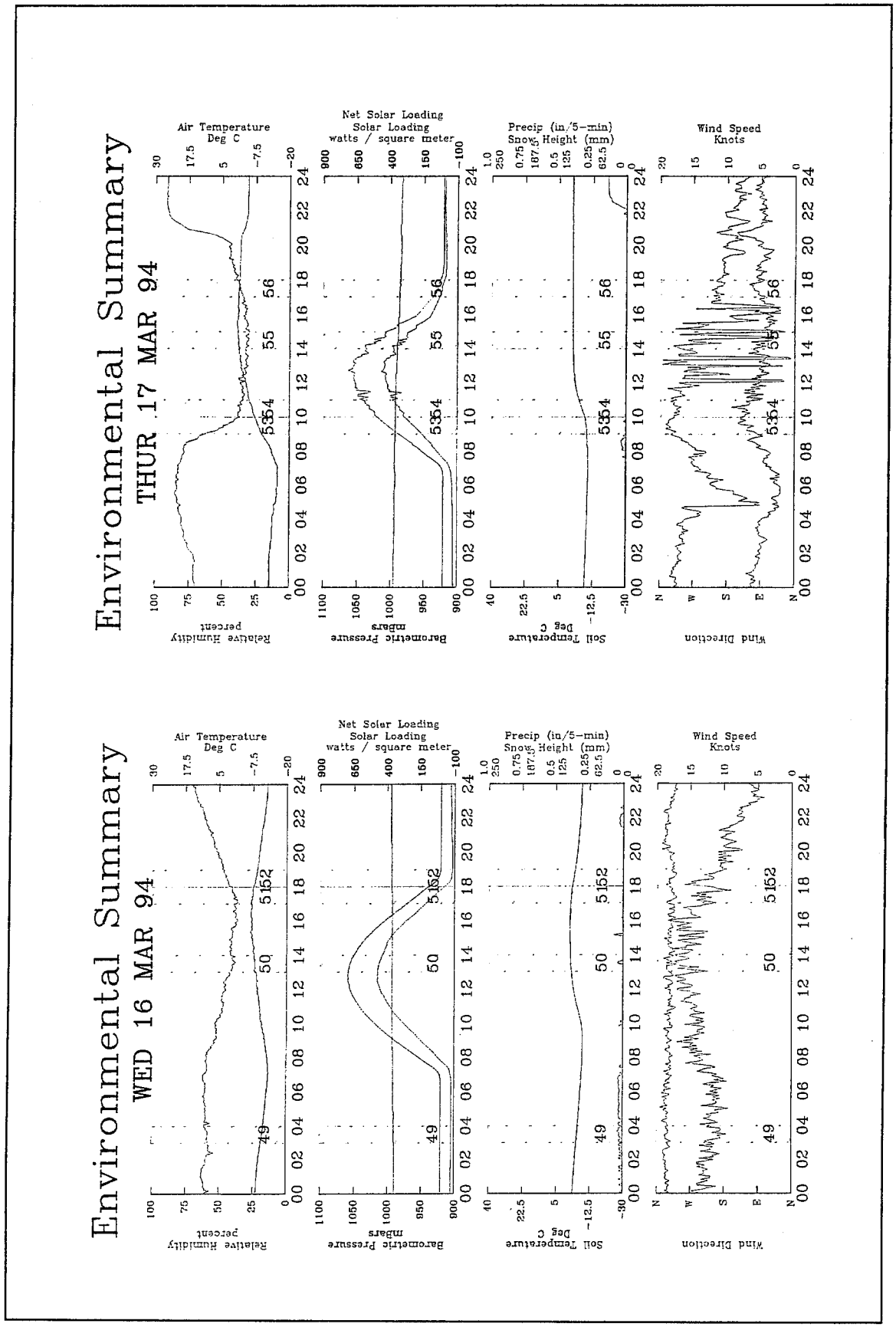

Environmental Summary
SAT 5 MAR 94
Air Temperature
Deg C
Net Solar Loading
Solar Loading
watts / square meter
Precip (in/5-min)
Snow Height (mm)
Wind Speed
Knots
Relative Humidity
percent
Barometric Pressure
mbars
Soil Temperature
Deg C
Wind Direction
Environmental Summary
FRI 4 MAR 94
Air Temperature
Deg C
Net Solar Loading
Solar Loading
watts / square meter
Precip (in/5-min)
Snow Height (mm)
Wind Speed
Knots
Relative Humidity
percent
Barometric Pressure
mbars
Soil Temperature
Deg C
Wind Direction

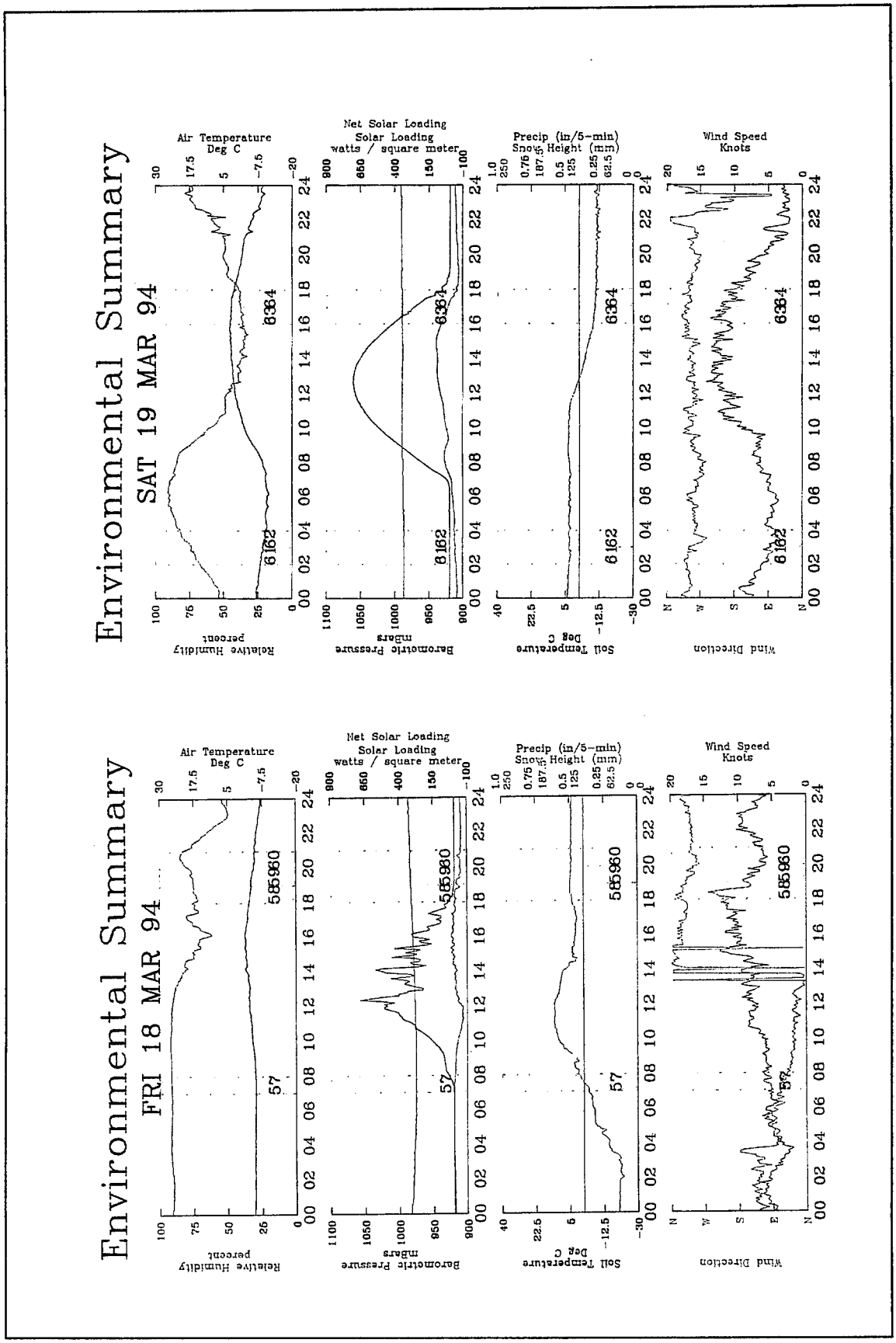

Environmental Summary
TUE 8 MAR 94
Air Temperature
Deg C
Net Solar Loading
Solar Loading
watts / square meter
Precip (in/5-min)
Snow Height (mm)
Wind Speed
Knots
Relative Humidity
percent
Barometric Pressure
mbars
Soil Temperature
Deg C
Wind Direction
Environmental Summary
WED 9 MAR 94
Air Temperature
Deg C
Net Solar Loading
Solar Loading
watts / square meter
Precip (in/5-min)
Snow Height (mm)
Wind Speed
Knots
Relative Humidity
percent
Barometric Pressure
mbars
Soil Temperature
Deg C
Wind Direction

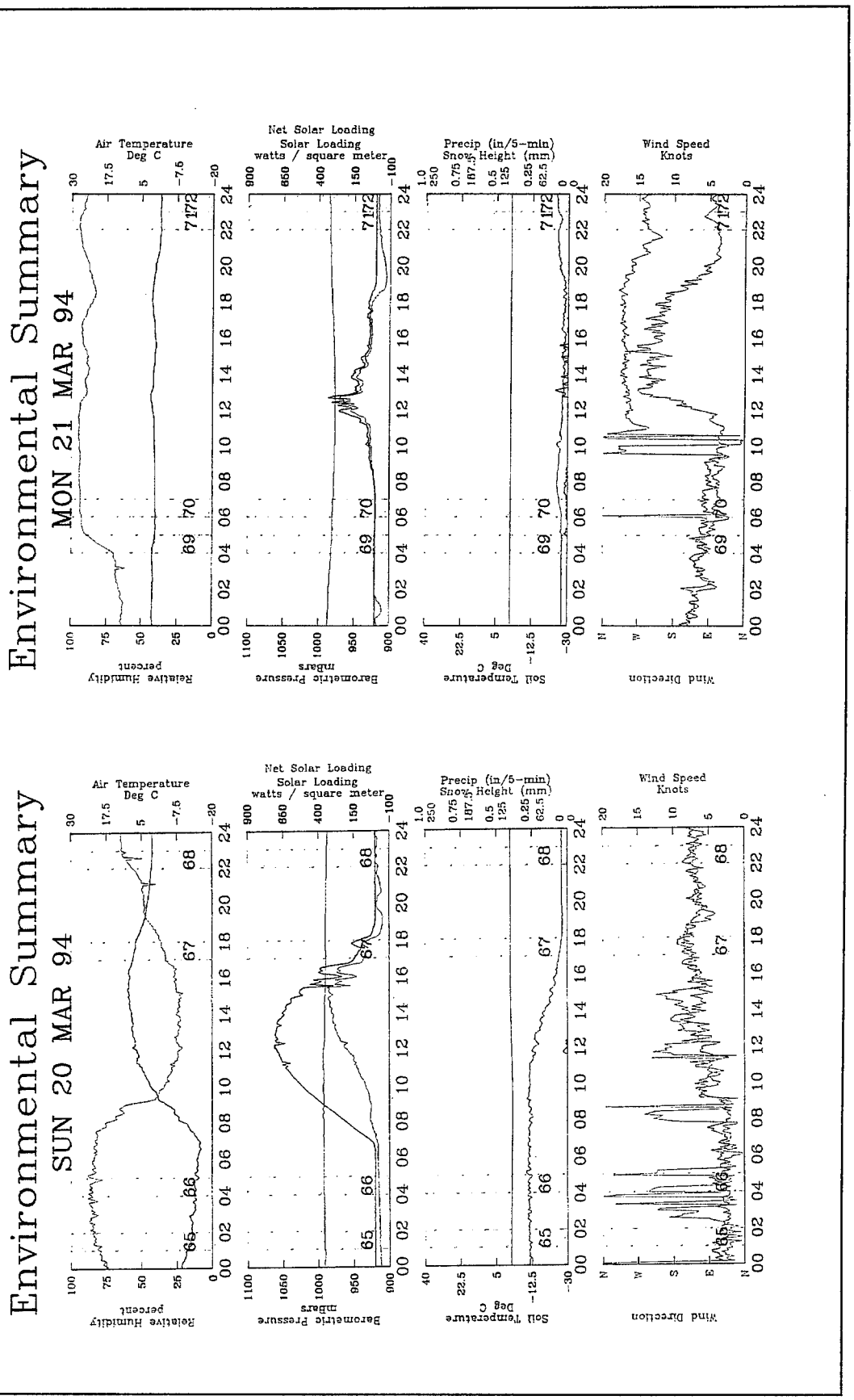

Environmental Summary
FRI 11 MAR 94
Air Temperature
Deg C
Relative Humidity
percent
Net Solar Loading
Solar Loading
watts / square meter
Barometric Pressure
mbars
Precip (in/5-min)
Snow Height (mm)
Soil Temperature
Deg C
Wind Speed
Knots
Wind Direction
Environmental Summary
THUR 10 MAR 94
Air Temperature
Deg C
Relative Humidity
percent
Net Solar Loading
Solar Loading
watts / square meter
Barometric Pressure
mbars
Precip (in/5-min)
Snow Height (mm)
Soil Temperature
Deg C
Wind Speed
Knots
Wind Direction

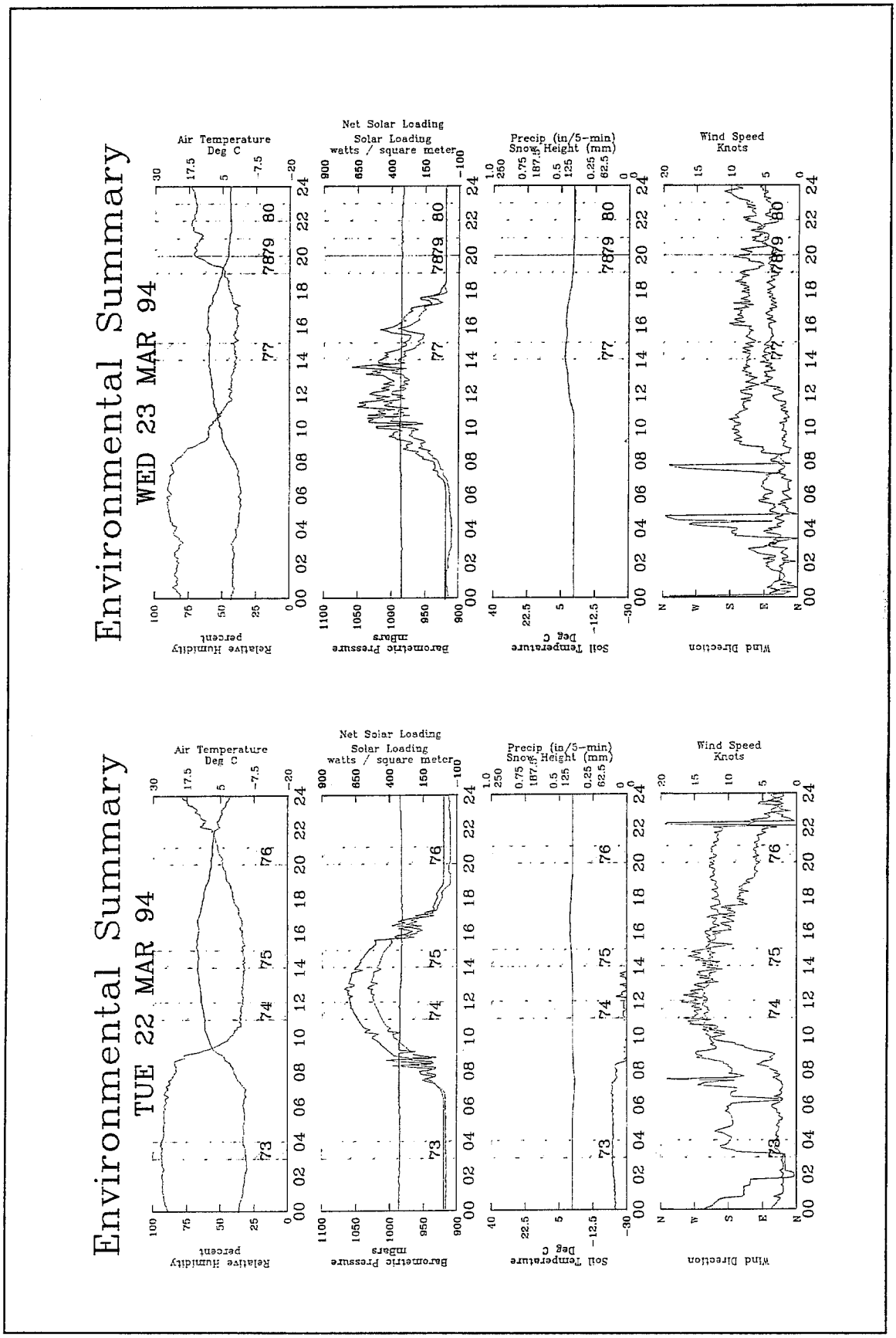

Environmental Summary
SUN 13 MAR 94
Air Temperature
Deg C
Net Solar Loading
Solar Loading
watts / square meter
Precip (in/5-min)
Snow Height (mm)
Wind Speed
Knots
Relative Humidity
percent
Barometric Pressure
mbars
Soil Temperature
Deg C
Wind Direction
Environmental Summary
SAT 12 MAR 94
Air Temperature
Deg C
Net Solar Loading
Solar Loading
watts / square meter
Precip (in/5-min)
Snow Height (mm)
Wind Speed
Knots
Relative Humidity
percent
Barometric Pressure
mbars
Soil Temperature
Deg C
Wind Direction

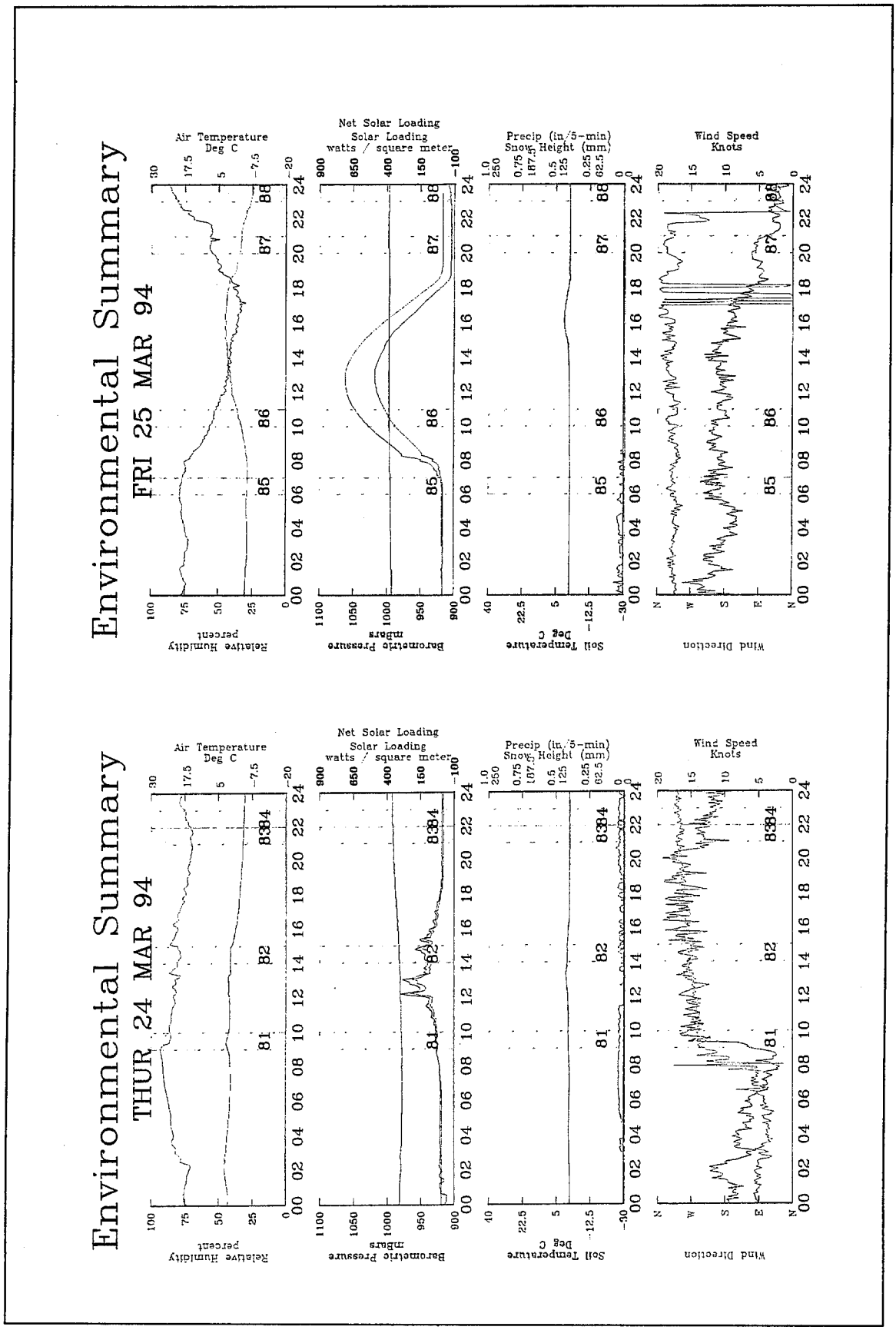

Environmental Summary
TUE 15 MAR 94
Air Temperature
Deg C
Net Solar Loading
Solar Loading
watts / square meter
Precip (in/5-min)
Snow Height (mm)
Wind Speed
Knots
Relative Humidity
percent
Barometric Pressure
mbars
Soil Temperature
Deg C
Wind Direction
Environmental Summary
MON 14 MAR 94
Air Temperature
Deg C
Net Solar Loading
Solar Loading
watts / square meter
Precip (in/5-min)
Snow Height (mm)
Wind Speed
Knots
Relative Humidity
percent
Barometric Pressure
mbars
Soil Temperature
Deg C
Wind Direction

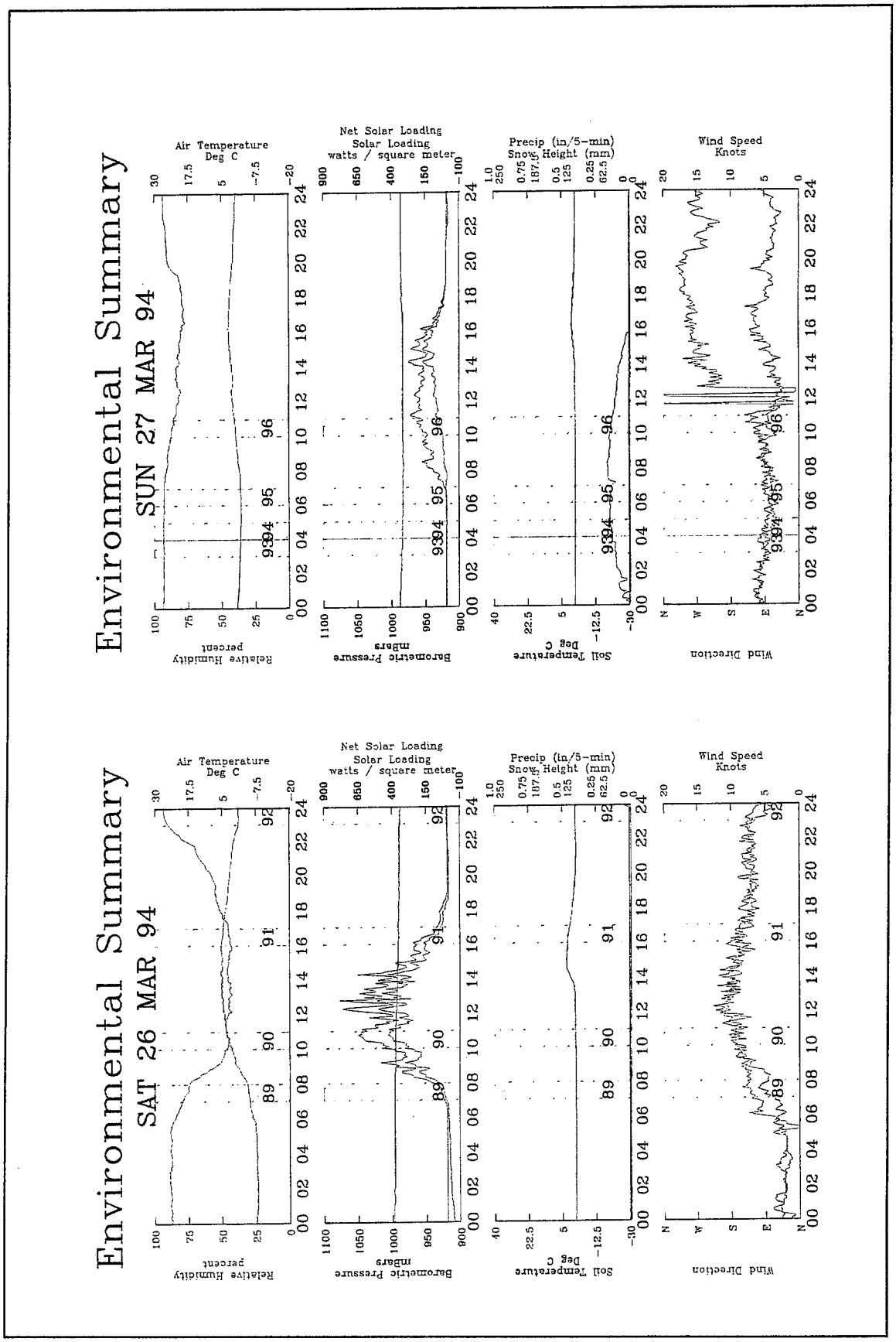

Environmental Summary
THUR 17 MAR 94
Air Temperature
Deg C
Relative Humidity
percent
Net Solar Loading
Solar Loading
watts / square meter
Barometric Pressure
mbars
Precip (in./5-min)
Snow Height (mm)
Soil Temperature
Deg C
Wind Speed
Knots
Wind Direction
Environmental Summary
WED 16 MAR 94
Air Temperature
Deg C
Relative Humidity
percent
Net Solar Loading
Solar Loading
watts / square meter
Barometric Pressure
mbars
Precip (in./5-min)
Snow Height (mm)
Soil Temperature
Deg C
Wind Speed
Knots
Wind Direction

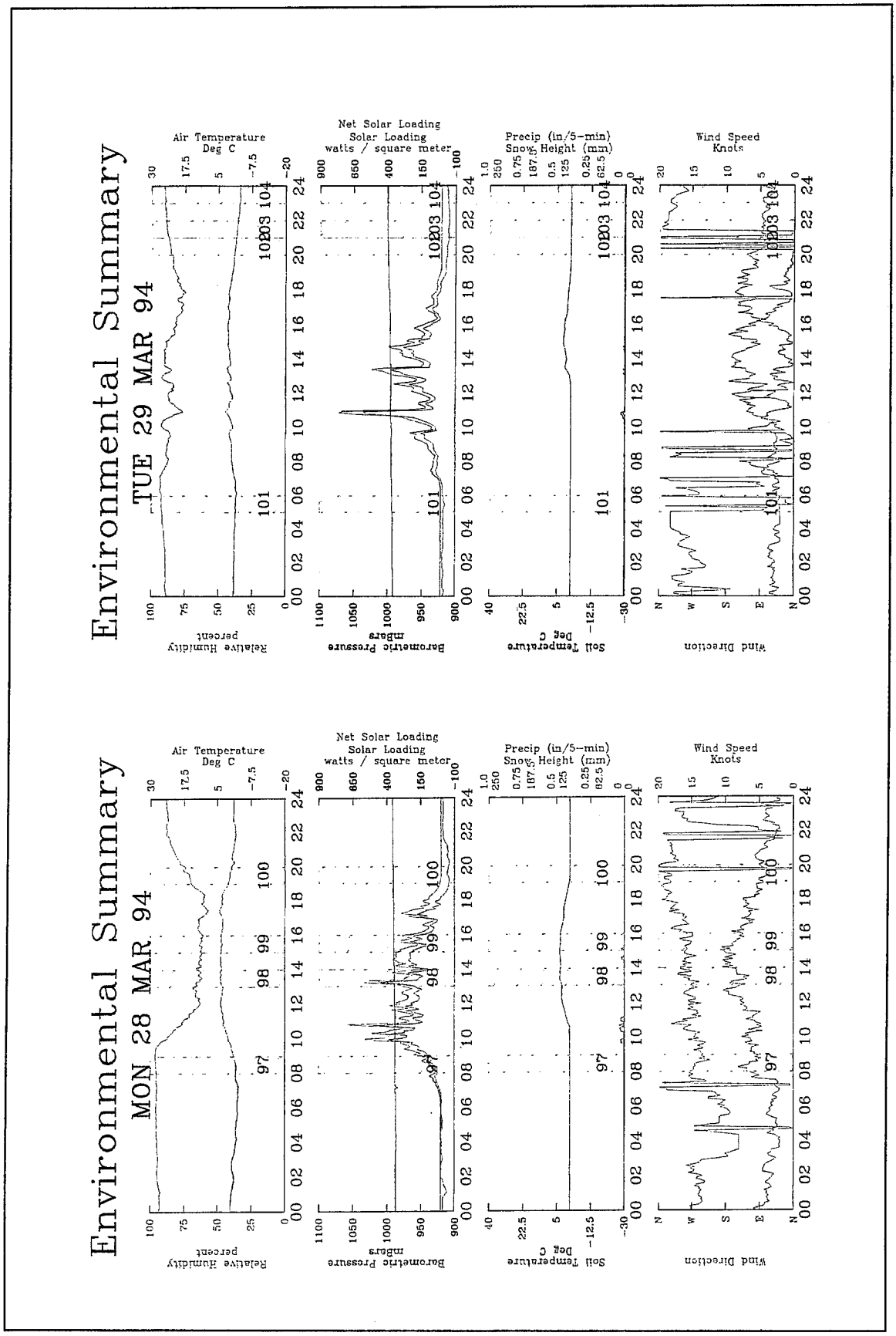

Environmental Summary
SAT 19 MAR 94
Air Temperature
Deg C
Net Solar Loading
Solar Loading
watts / square meter
Precip (in/5-min)
Snow Height (mm)
Wind Speed
Knots
Relative Humidity
percent
Barometric Pressure
mbars
Soil Temperature
Deg C
Wind Direction
Environmental Summary
FRI 18 MAR 94
Air Temperature
Deg C
Net Solar Loading
Solar Loading
watts / square meter
Precip (in/5-min)
Snow Height (mm)
Wind Speed
Knots
Relative Humidity
percent
Barometric Pressure
mbars
Soil Temperature
Deg C
Wind Direction

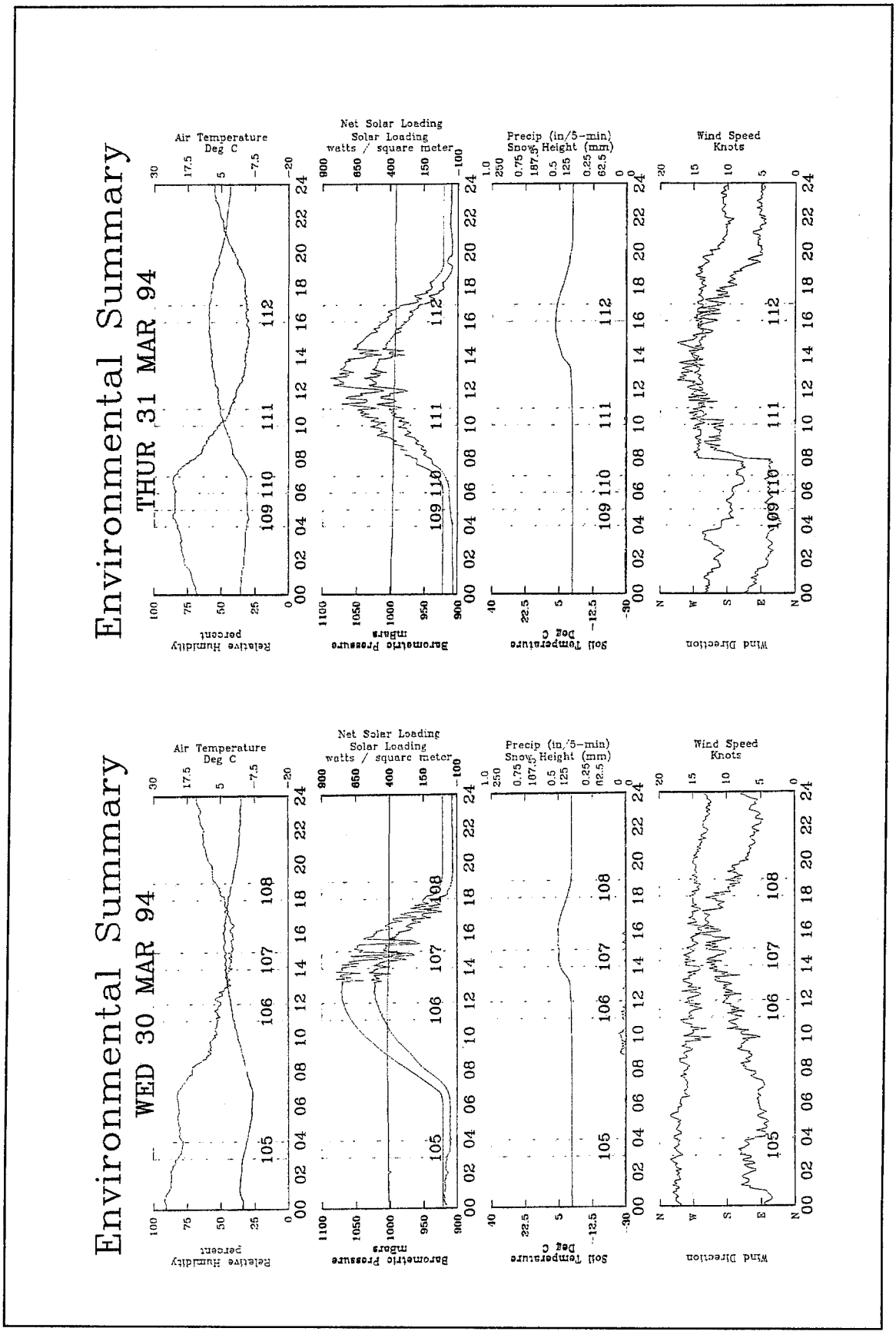

Environmental Summary
SUN 20 MAR 94
Air Temperature
Deg C
Net Solar Loading
Solar Loading
watts / square meter
Precip (in/5-min)
Snow Height (mm)
Wind Speed
Knots
Relative Humidity
percent
Barometric Pressure
mbars
Soil Temperature
Deg C
Wind Direction
Environmental Summary
MON 21 MAR 94
Air Temperature
Deg C
Net Solar Loading
Solar Loading
watts / square meter
Precip (in/5-min)
Snow Height (mm)
Wind Speed
Knots
Relative Humidity
percent
Barometric Pressure
mbars
Soil Temperature
Deg C
Wind Direction

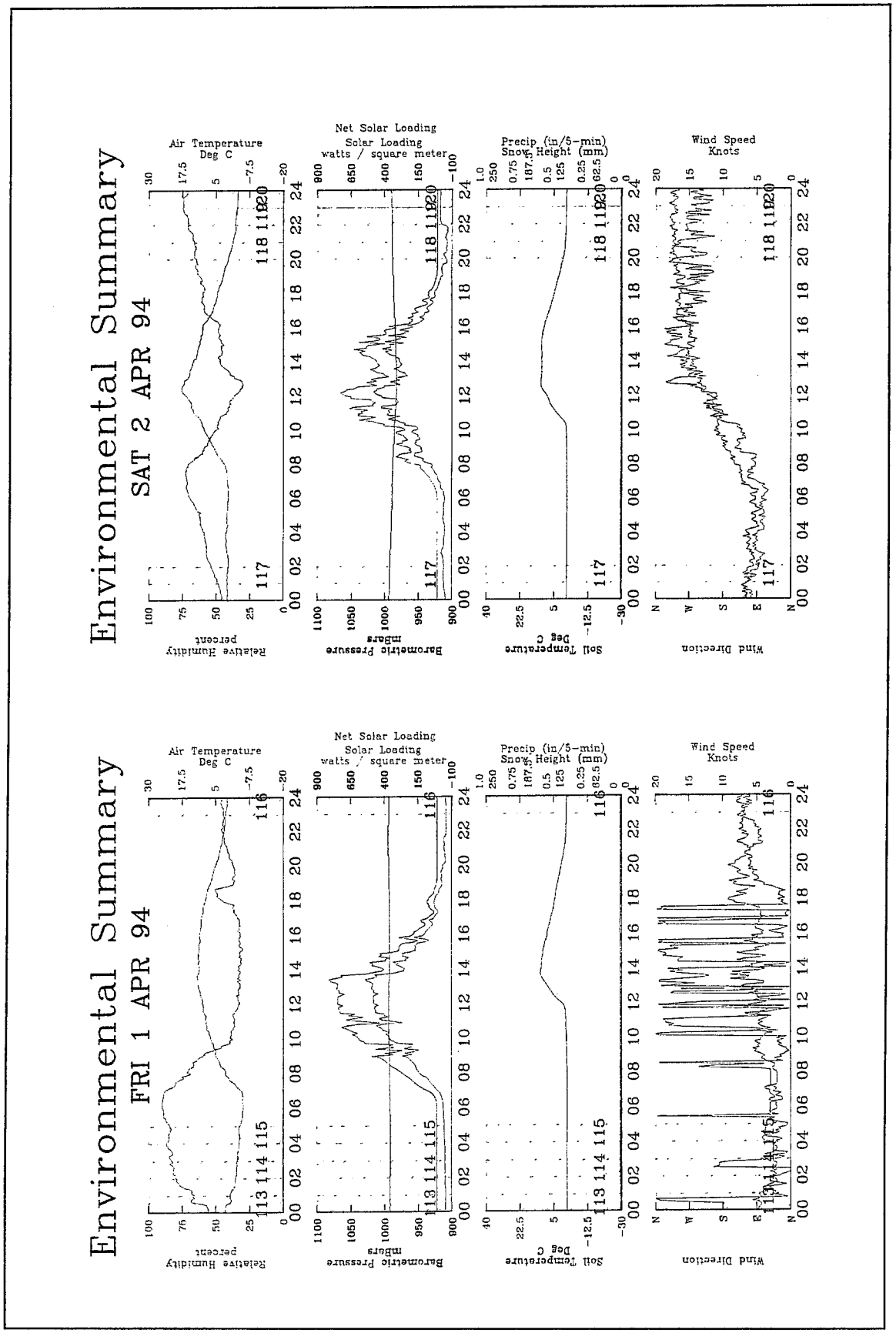

Environmental Summary
WED 23 MAR 94
Air Temperature
Deg C
Relative Humidity
percent
Net Solar Loading
Solar Loading
watts / square meter
Barometric Pressure
mbars
Precip (in/5-min)
Snow Height (mm)
Soil Temperature
Deg C
Wind Speed
Knots
Wind Direction
Environmental Summary
TUE 22 MAR 94
Air Temperature
Deg C
Relative Humidity
percent
Net Solar Loading
Solar Loading
watts / square meter
Barometric Pressure
mbars
Precip (in/5-min)
Snow Height (mm)
Soil Temperature
Deg C
Wind Speed
Knots
Wind Direction

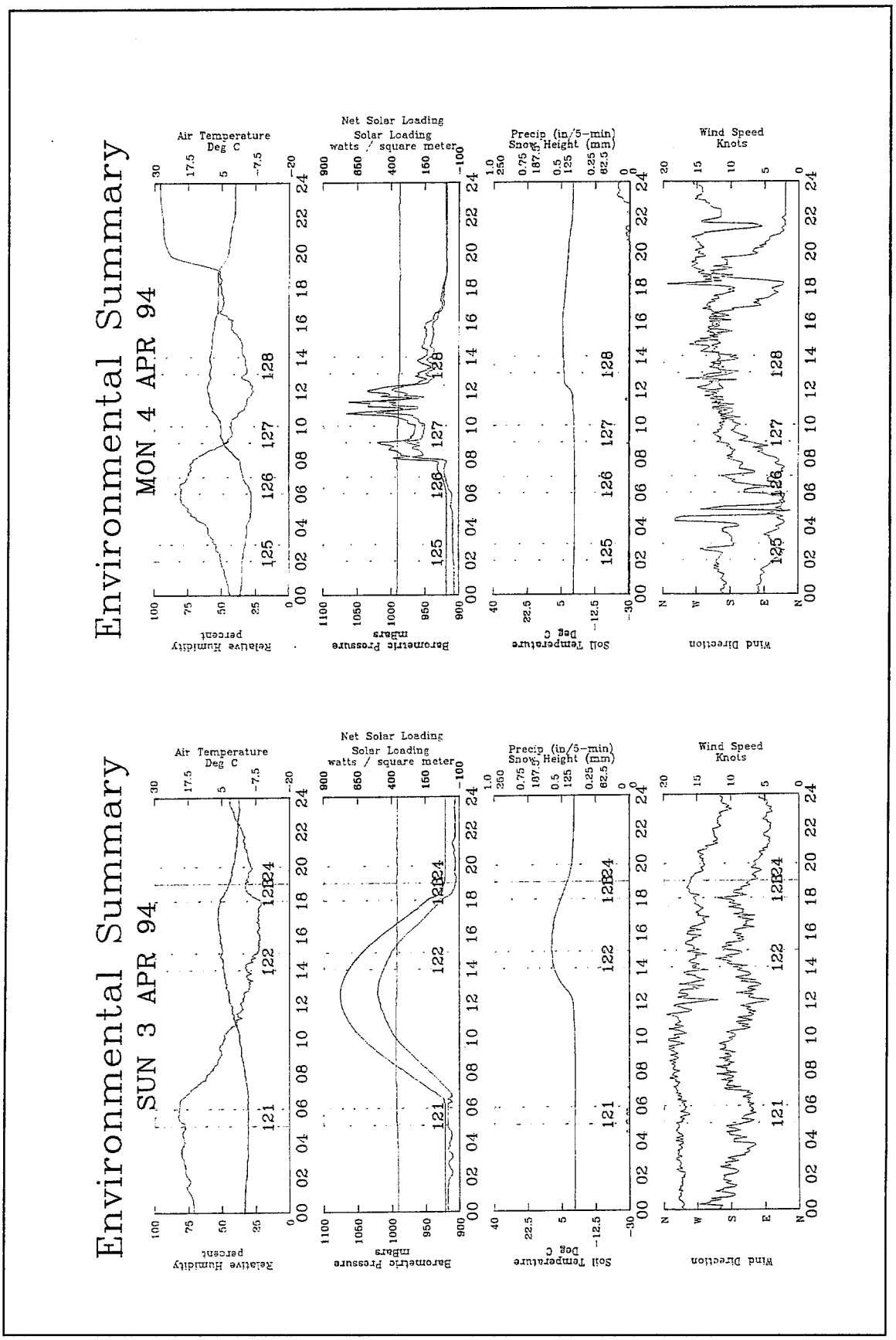

Environmental Summary
FRI 25 MAR 94
Air Temperature
Deg C
Relative Humidity
percent
Net Solar Loading
Solar Loading
watts / square meter
Barometric Pressure
mbars
Precip (in/5-min)
Snow Height (mm)
Soil Temperature
Deg C
Wind Speed
Knots
Wind Direction
Environmental Summary
THUR 24 MAR 94
Air Temperature
Deg C
Relative Humidity
percent
Net Solar Loading
Solar Loading
watts / square meter
Barometric Pressure
mbars
Precip (in/5-min)
Snow Height (mm)
Soil Temperature
Deg C
Wind Speed
Knots
Wind Direction

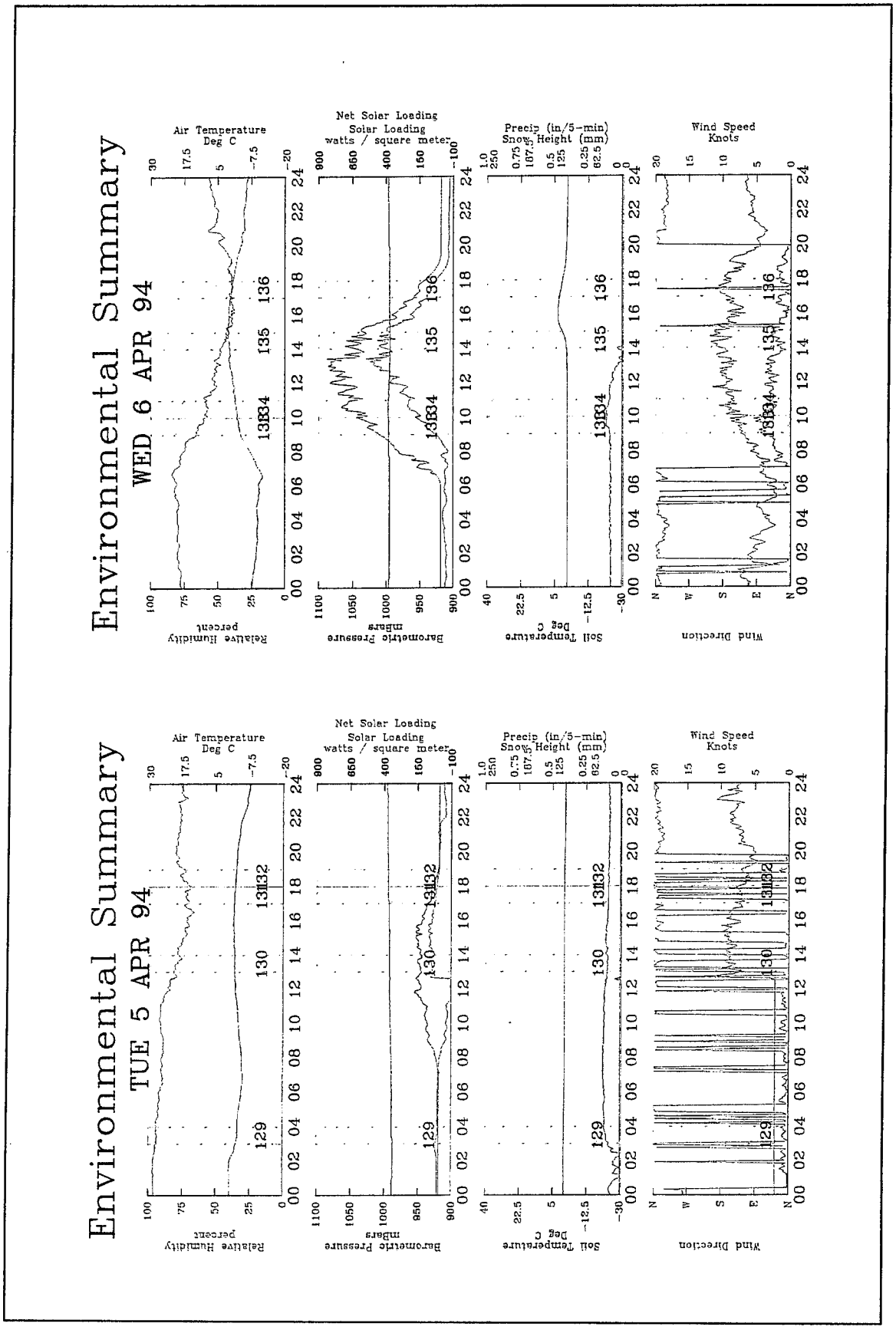

Environmental Summary
SUN 27 MAR 94
Air Temperature
Deg C
Relative Humidity
percent
Net Solar Loading
Solar Loading
watts / square meter
Barometric Pressure
mbars
Precip (in/5-min)
Snow Height (mm)
Soil Temperature
Deg C
Wind Speed
Knots
Wind Direction
Environmental Summary
SAT 26 MAR 94
Air Temperature
Deg C
Relative Humidity
percent
Net Solar Loading
Solar Loading
watts / square meter
Barometric Pressure
mbars
Precip (in/5-min)
Snow Height (mm)
Soil Temperature
Deg C
Wind Speed
Knots
Wind Direction

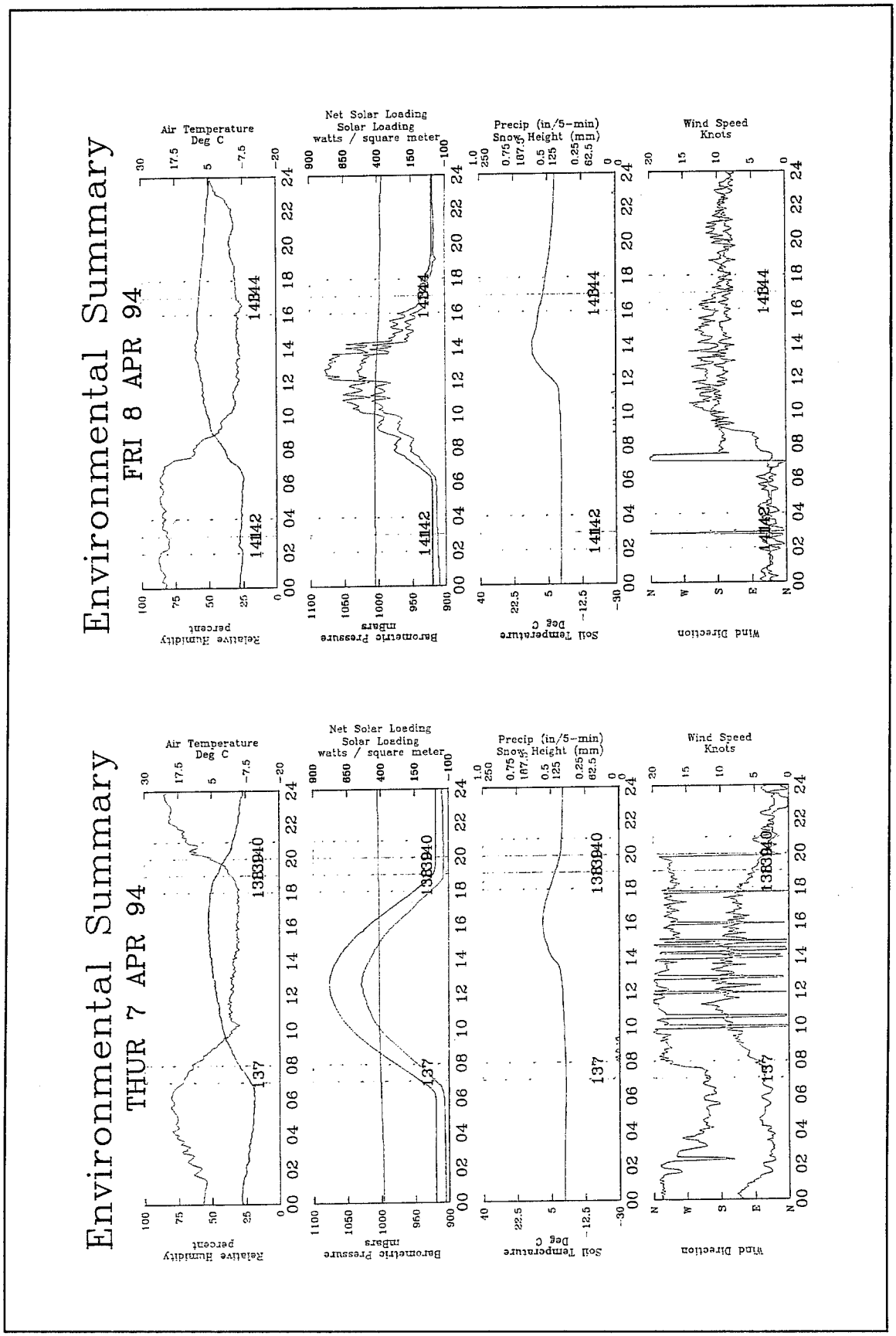

Environmental Summary
TUE 29 MAR 94
Air Temperature
Deg C
Net Solar Loading
Solar Loading
watts / square meter
Precip (in/5-min)
Snow Height (mm)
Wind Speed
Knots
Relative Humidity
percent
Barometric Pressure
mbars
Soil Temperature
Deg C
Wind Direction
Environmental Summary
MON 28 MAR 94
Air Temperature
Deg C
Net Solar Loading
Solar Loading
watts / square meter
Precip (in/5-min)
Snow Height (mm)
Wind Speed
Knots
Relative Humidity
percent
Barometric Pressure
mbars
Soil Temperature
Deg C
Wind Direction

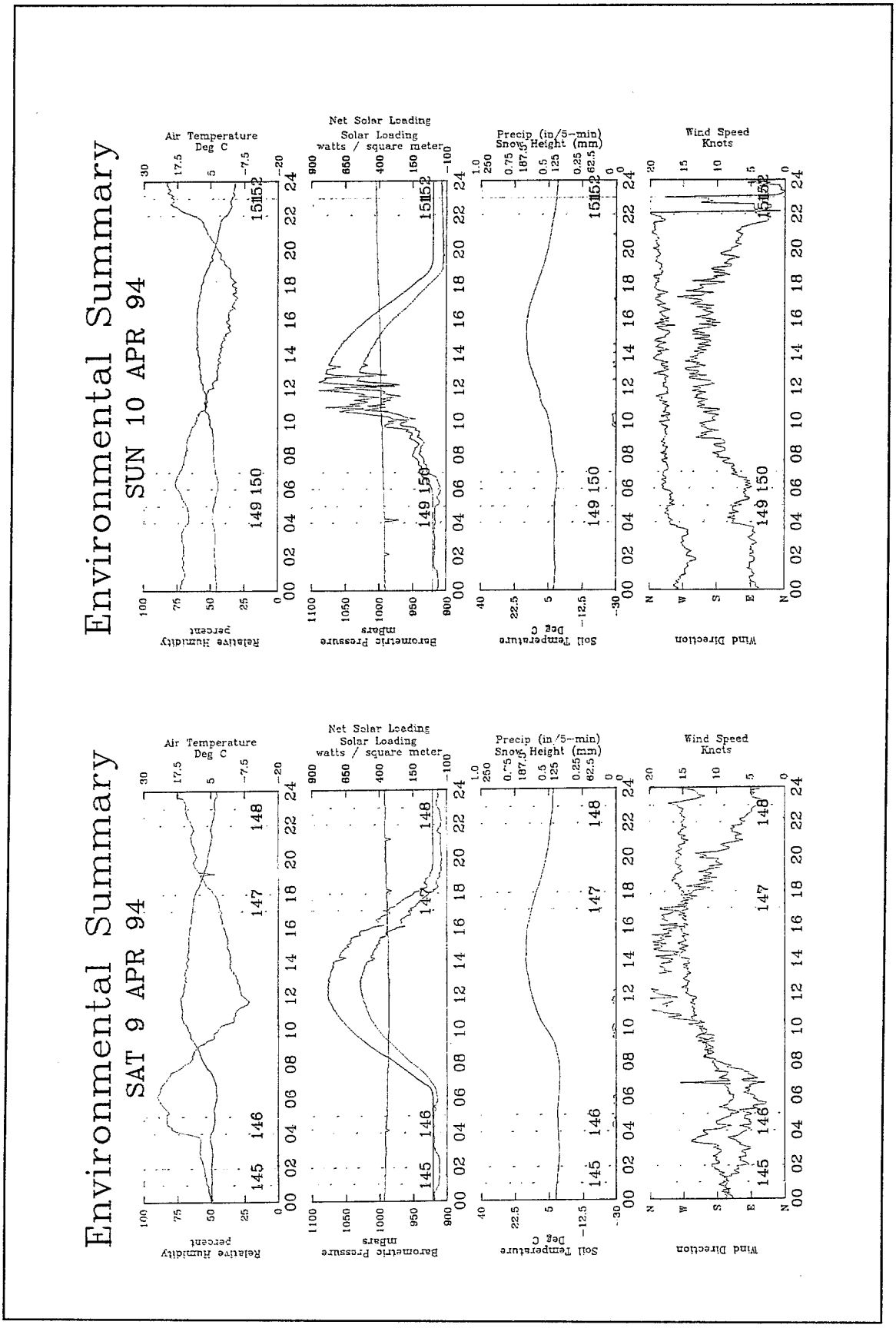

Environmental Summary
THUR 31 MAR 94
Air Temperature
Deg C
Relative Humidity
percent
Net Solar Loading
Solar Loading
watts / square meter
Barometric Pressure
mbars
Precip (in/5-min)
Snow Height (mm)
Soil Temperature
Deg C
Wind Speed
Knots
Wind Direction
Environmental Summary
WED 30 MAR 94
Air Temperature
Deg C
Relative Humidity
percent
Net Solar Loading
Solar Loading
watts / square meter
Barometric Pressure
mbars
Precip (in/5-min)
Snow Height (mm)
Soil Temperature
Deg C
Wind Speed
Knots
Wind Direction

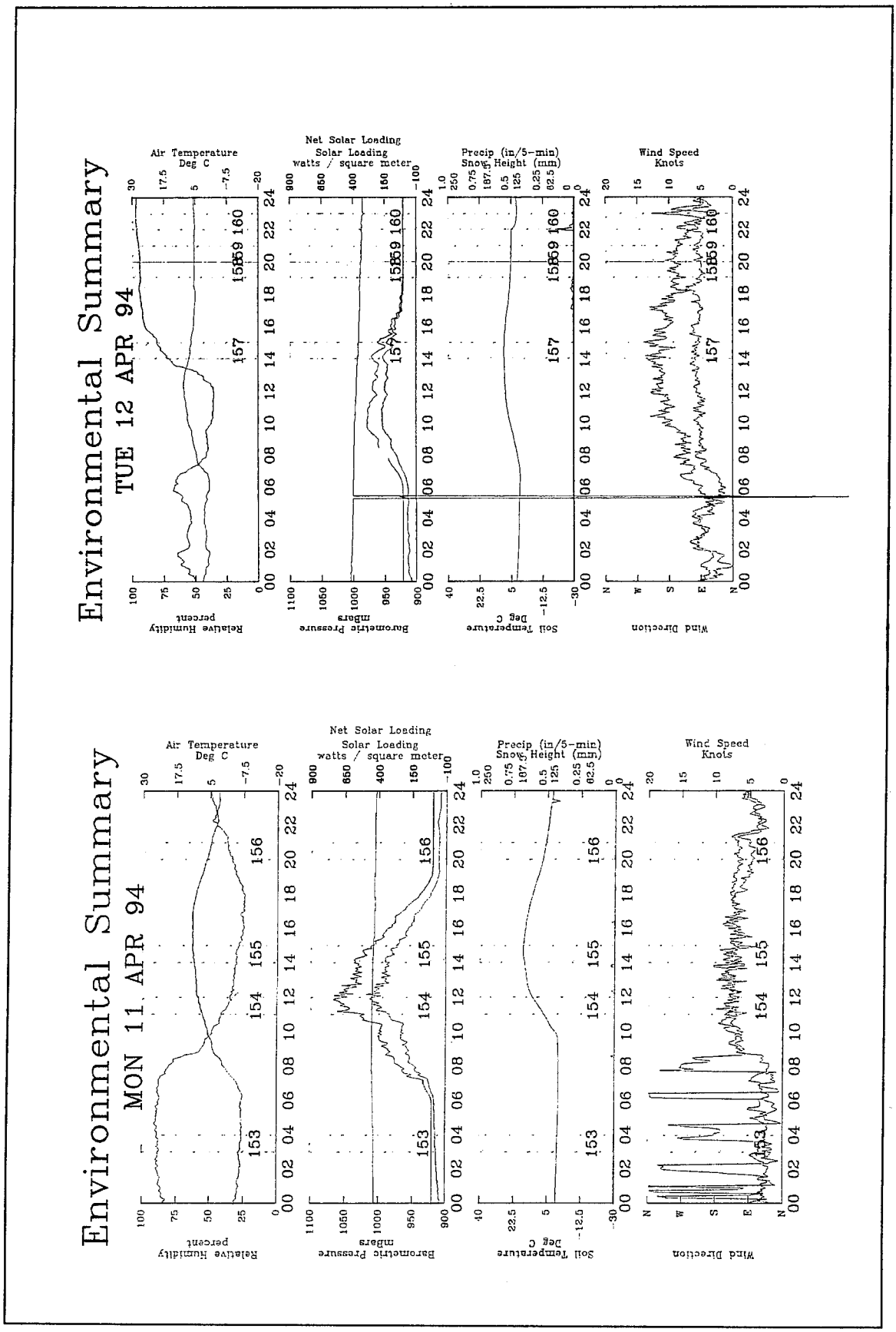

Environmental Summary
SAT 2 APR 94
Air Temperature
Deg C
Net Solar Loading
Solar Loading
watts / square meter
Precip (in/5-min)
Snow Height (mm)
Wind Speed
Knots
Relative Humidity
percent
Barometric Pressure
mbars
Soil Temperature
Deg C
Wind Direction
Environmental Summary
FRI 1 APR 94
Air Temperature
Deg C
Net Solar Loading
Solar Loading
watts / square meter
Precip (in/5-min)
Snow Height (mm)
Wind Speed
Knots
Relative Humidity
percent
Barometric Pressure
mbars
Soil Temperature
Deg C
Wind Direction

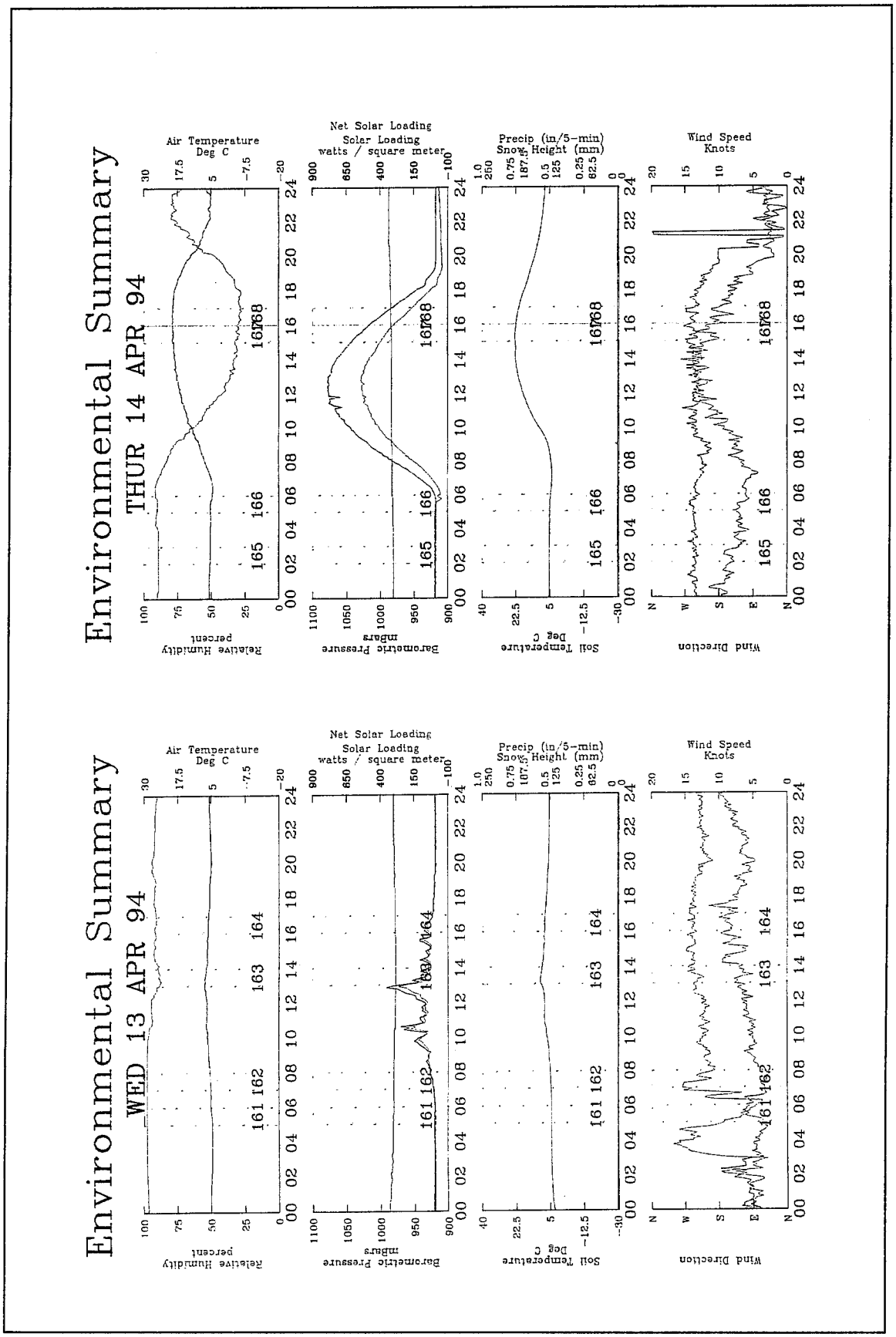

Environmental Summary
MON 4 APR 94
Air Temperature
Deg C
Relative Humidity
percent
Net Solar Loading
Solar Loading
watts / square meter
Barometric Pressure
mbars
Precip (in/5-min)
Snow Height (mm)
Soil Temperature
Deg C
Wind Speed
Knots
Wind Direction
Environmental Summary
SUN 3 APR 94
Air Temperature
Deg C
Relative Humidity
percent
Net Solar Loading
Solar Loading
watts / square meter
Barometric Pressure
mbars
Precip (in/5-min)
Snow Height (mm)
Soil Temperature
Deg C
Wind Speed
Knots
Wind Direction

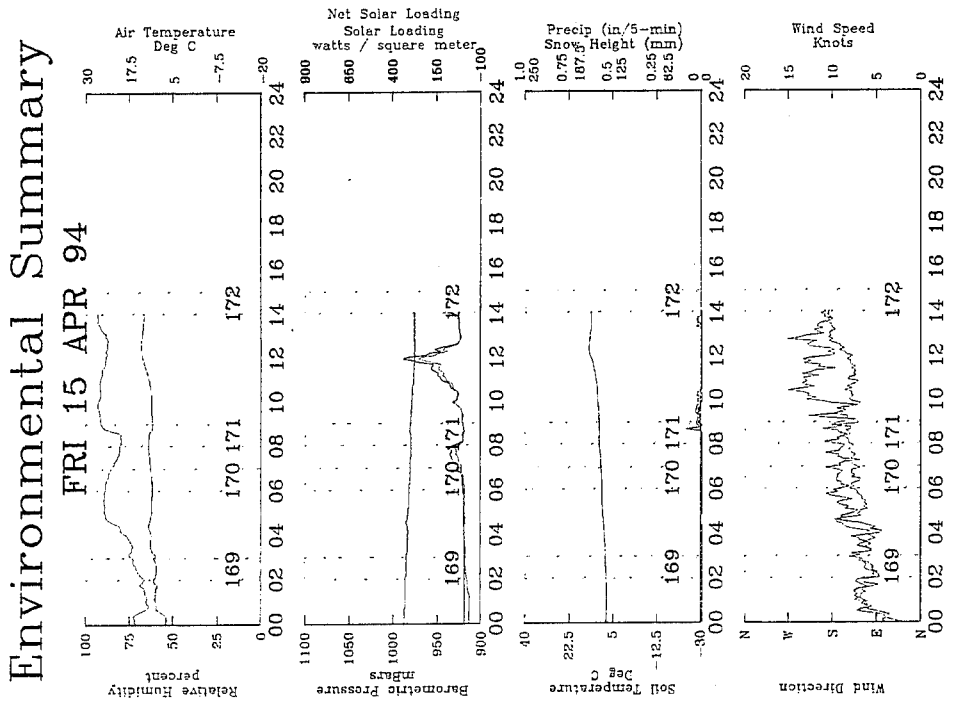

Environmental Summary
WED 6 APR 94
Air Temperature
Deg C
Net Solar Loading
Solar Loading
watts / square meter
Precip (in/5-min)
Snow Height (mm)
Wind Speed
Knots
Relative Humidity
percent
Barometric Pressure
mbars
Soil Temperature
Deg C
Wind Direction
Environmental Summary
TUE 5 APR 94
Air Temperature
Deg C
Net Solar Loading
Solar Loading
watts / square meter
Precip (in/5-min)
Snow Height (mm)
Wind Speed
Knots
Relative Humidity
percent
Barometric Pressure
mbars
Soil Temperature
Deg C
Wind Direction


Environmental Summary
FRI 8 APR 94
Air Temperature
Deg C
Relative Humidity
percent
Net Solar Loading
Solar Loading
watts / square meter
Barometric Pressure
mbars
Precip (in/5-min)
Snow Height (mm)
Soil Temperature
Deg C
Wind Speed
Knots
Wind Direction
Environmental Summary
THUR 7 APR 94
Air Temperature
Deg C
Relative Humidity
percent
Net Solar Loading
Solar Loading
watts / square meter
Barometric Pressure
mbars
Precip (in/5-min)
Snow Height (mm)
Soil Temperature
Deg C
Wind Speed
Knots
Wind Direction


Environmental Summary
SUN 10 APR 94
Air Temperature
Deg C
Net Solar Loading
Solar Loading
watts / square meter
Precip (in/5-min)
Snow Height (mm)
Wind Speed
Knots
Relative Humidity
percent
Barometric Pressure
mbars
Soil Temperature
Deg C
Wind Direction
Environmental Summary
SAT 9 APR 94
Air Temperature
Deg C
Net Solar Loading
Solar Loading
watts / square meter
Precip (in/5-min)
Snow Height (mm)
Wind Speed
Knots
Relative Humidity
percent
Barometric Pressure
mbars
Soil Temperature
Deg C
Wind Direction


Environmental Summary
TUE 12 APR 94
Air Temperature
Deg C
Relative Humidity
percent
Net Solar Loading
Solar Loading
watts / square meter
Barometric Pressure
mbars
Precip (in/5-min)
Snow Height (mm)
Soil Temperature
Deg C
Wind Speed
Knots
Wind Direction
Environmental Summary
MON 11 APR 94
Air Temperature
Deg C
Relative Humidity
percent
Net Solar Loading
Solar Loading
watts / square meter
Barometric Pressure
mbars
Precip (in/5-min)
Snow Height (mm)
Soil Temperature
Deg C
Wind Speed
Knots
Wind Direction


Environmental Summary
THUR 14 APR 94
Air Temperature
Deg C
Relative Humidity
percent
Net Solar Loading
Solar Loading
watts / square meter
Barometric Pressure
mbars
Precip (in/5-min)
Snow Height (mm)
Soil Temperature
Deg C
Wind Speed
Knots
Wind Direction
Environmental Summary
WED 13 APR 94
Air Temperature
Deg C
Relative Humidity
percent
Net Solar Loading
Solar Loading
watts / square meter
Barometric Pressure
mbars
Precip (in/5-min)
Snow Height (mm)
Soil Temperature
Deg C
Wind Speed
Knots
Wind Direction


Enviromental Summary
FRI 15 APR 94
Air Temperature
Deg C
Relative Humidity
percent
Net Solar Loading
Solar Loading
watts / square meter
Barometric Pressure
mBars
Precip (in./5-min)
Snow Height (mm)
Soil Temperature
Deg C
Wind Speed
Knots
Wind Direction
00 02 04 06 08 10 12 14 16 18 20 22 24
169 170 171 172